The world's most comprehensive encyclopedia of the military weapons of the 20th century

WAR MACHINE

An ORBIS Publication

80p 65

IR £1 Aus $1.95 NZ $2.25 SA R1.95 Sing $4.50 USA & Can $1.95

Armed Forces of the World: US Army (Part 4)

The Battle for Cassino

The Lee-Enfield Story

Development of the German Assault Rifle

The Role of the Sniper

A fully illustrated guide to Rifles of World War II

WAR MACHINE

Volume 6 **Issue 65**

Published by
Orbis Publishing Ltd
© Aerospace Publishing Ltd 1984
Editorial Offices
War Machine
Aerospace Publishing Ltd
10 Barley Mow Passage
London W4 4PH

Managing Editor: Stan Morse

Editorial: Trisha Palmer
Chris Bishop
Chris Chant

Design: Rod Teasdale

Colour Origination: Imago Publishing Ltd, Thame, Oxon

Typesetting: SX Composing Ltd

Film work: Precise Litho Ltd

Artists:
Richard Hook
Frank Kennard
Pierre Turner

298411

Printed in Great Britain

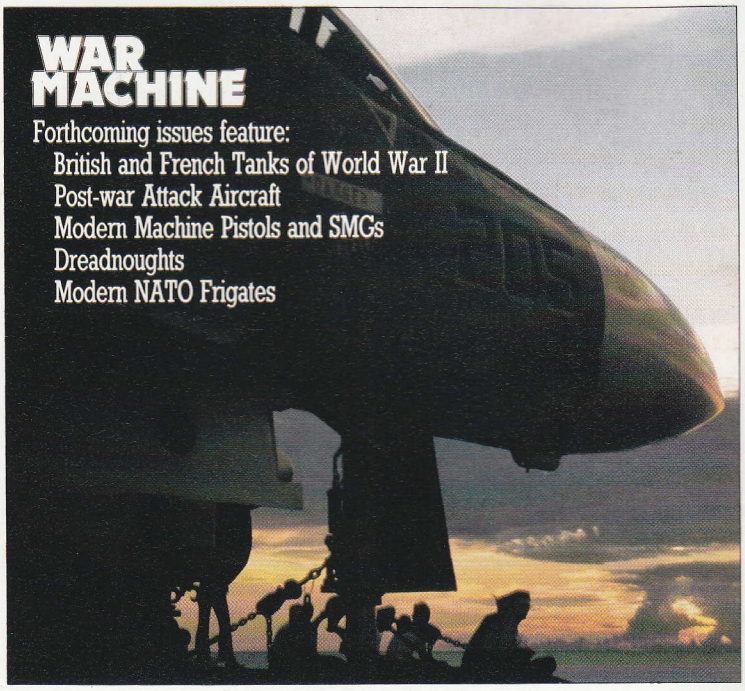
Subscription Manager: Christine Allen
0488 72666

Consultant Editor: Major General Sir Jeremy Moore KCB OBE MC, Commander of British Land Forces during the Falklands campaign.

Distribution and marketing offices:
Orbis Publishing Ltd
Orbis House
20-22 Bedfordbury
London WC2N 4BT
Telephone: 01-379 6711

Circulation Director: David Breed

Marketing Director: Michael Joyce



Picture acknowledgements

Cover photograph: Imperial War Museum. **1281:** T.J./Imperial War Museum. **1282:** Imperial War Museum/Imperial War Museum. **1283:** T.J. **1284:** Imperial War Museum. **1285:** Imperial War Museum/T.J./Imperial War Museum. **1286:** Imperial War Museum. **1287:** Imperial War Museum/T.J. **1288:** Imperial War Museum/Imperial War Museum. **1289:** Imperial War Museum. **1291:** Imperial War Museum. **1292:** T.J. **1293:** Imperial War Museum. **1295:** Imperial War Museum. **1296:** Robert Hunt Library/Robert Hunt Library. **1297:** Imperial War Museum/Robert Hunt Library. **1298:** T.J. **1299:** Imperial War Museum/Imperial War Museum/Imperial War Museum. **1300:** Imperial War Museum/Imperial War Museum. **(iii):** US Army/US Army. **(iv):** US Army.

We are most grateful to the Weapons Museum, School of Infantry, Warminster, for their kind permission to photograph weapons from their collection.

HOW TO OBTAIN ISSUES AND BINDERS FOR WAR MACHINE

Issues can be obtained by placing an order with your newsagent or direct from our Subscription Department. If you have difficulty obtaining any back issues from your newsagent, please write to us stating the issue(s) required and enclosing a cheque for the cover price of the issue(s).

AUSTRALIA please write to: Gordon and Gotch (Aus) Ltd, 114 William Street, PO Box 767G, Melbourne, Victoria 3001. MALTA, NEW ZEALAND, SINGAPORE & SOUTH AFRICA: Back numbers are available at cover price from your newsagent. In case of difficulty, write to the address given for binders.

UK/EIRE
PRICE: 80p/IR£1
SUBSCRIPTION:
6 Months: £23.92
1 Year: £47.84
BINDER: Please send £3.95 per binder, or take advantage of our special offer in early issues.

EUROPE
PRICE: 80p
SUBSCRIPTION:
6 Months air: £42.12
surface: £33.54
1 Year air: £84.24
surface: £67.08
BINDER: £5.00
AIRMAIL: £5.50

MALTA
Obtain BINDERS from your newsagent or Miller (Malta) Ltd, MA Vassalli Street, Valetta, Malta
Price: £3.95

MIDDLE EAST
PRICE: 80p
SUBSCRIPTION:
6 Months air: £44.98
surface: £42.12
1 Year air: £89.96
surface: £84.24
BINDER: £5.50
AIRMAIL: £8.30

AMERICAS/ASIA/AFRICA
PRICE: US$1.95/80p
SUBSCRIPTION:
6 Months air: £53.30
surface: £42.12
1 Year air: £106.60
surface: £84.24
BINDER: £5.50
AIRMAIL: £9.50

SOUTH AFRICA
PRICE: R2.35
Obtain BINDERS from any branch of Central News Agency or Intermag, PO Box 57394, Springfield 2137

SINGAPORE
PRICE: Sing$2
Obtain BINDERS from MPH Distributors 601 Sims Drive 03-07-21 Singapore 1438

AUSTRALIA/FAR EAST
PRICE: 80p
SUBSCRIPTION:
6 Months air: £57.46
surface: £42.12
1 Year air: £114.92
surface: £84.24
BINDER: £5.50
AIRMAIL: £10.00

AUSTRALIA
PRICE: AUS$2.25
Obtain BINDERS from First Post Pty Ltd, 23 Chandos Street St Leonards, NSW 2065

NEW ZEALAND
PRICE: NZ$2.80
Obtain BINDERS from your newsagent or Gordon & Gotch (NZ) Ltd, PO Box 1595, Wellington

ADDRESS FOR BINDERS AND BACK ISSUES
Orbis Publishing Limited
Orbis House
20-22 Bedfordbury
London
WC2N 4BT
Telephone: 01-379-5211

Cheques/Postal Orders should be made payable to Orbis Publishing Limited. Binder prices include postage and packing and prices are in sterling.

Back Issues are sold at the cover price, and we do not charge carriage in the UK.

NOTE
Binders and back issues are obtainable subject to availability of stocks. Whilst every attempt is made to keep the price of the issues and binders constant, the publishers reserve the right to increase the stated prices at any time when circumstances dictate. Binders depicted in this publication are those produced for the UK and Australian markets only. Binders and Issues may be subject to import duty and/or local taxes, which are not included in the above prices unless stated.

ADDRESS FOR SUBSCRIPTIONS
Orbis Publishing Limited
Hurst Farm
Baydon Road
Lambourne Woodlands
Newbury
Berks
RG16 7TW
Telephone: 0488-72666

All cheques/Postal Orders should be made payable to Orbis Publishing Limited. Postage and packaging is included in subscription rates, and prices are given in Sterling.

Rifles of World War II

World War II saw the decline in importance of the infantryman as marksman and the first appearance of his replacement, the infantryman as firepower component. After an uncharacteristically tentative start, it was Germany who, as so often, led the way.

Manufactured in enormous numbers, the American M1 carbine was designed for rear echelon and vehicle-mounted troops. Its light and easy handling, however, made it preferable to the heavy full-sized rifle issued to many front-line troops.

In any army the new soldier is always trained in the use of one basic form of service rifle, whatever his eventual trade may be. During World War II this was as true as it is now, but the rifle with which the individual soldier might be trained varied a great deal. Depending on the particular nation, the soldier might have been issued with a venerable antique while in others he might have received a shiny new model embodying all the latest technology, for the rifles used in World War II varied greatly.

At one end of the scale there were the old bolt-action rifles that had been in use since long before World War I; and at the other were the new self-loading or automatic rifles that eventually led to the first of what are now known as assault rifles. There were none of the latter in service when the war started in 1939, but as the war progressed the first operational models of such weapons appeared in service. These gave the infantryman a greatly increased firepower potential, but it was not until the true assault rifles (with their lower-powered cartridges) arrived from about 1943 onwards that the full quantum jump from the slow and steady single shots of the bolt-action rifle to the full automatic fire of the assault rifle was fully appreciated. The bolt-action rifles were usually sound and reliable weapons, but they lacked the shock effect of an assault rifle fired in the fully automatic mode.

Thus World War II was a war of transition for the basic infantryman. When the war started, usually all he had to hand was a bolt-action rifle of a well-tried but frequently elderly pattern. By the time the war was over every soldier had at least a foretaste of what the future had in store in the form of the assault rifle. There were some odd digressions along the way, such as the underpowered US Carbine M1 and the ingenious but complex German FG 42. Some nations, such as the United Kingdom, did not make the transition and relied upon the Lee-Enfield bolt-action rifles throughout, but the move towards the self-loading or assault rifle was still there.

This analysis does not contain all the rifles used during World War II, but the weapons discussed are typical of the period. Millions of soldiers used them under all manner of conditions, and the survivors will remember them until their last days.

The Gewehr 98 was the standard rifle for the bulk of the German army throughout the war. While not as advanced as many models introduced after 1939, the Mauser design, dating from the late 1880s, provided sterling service throughout two world wars and was a sound, reliable weapon.

GERMANY

Gewehr 98 and Karabiner 98k

The 7.92-mm (0.312-in) **Gewehr 98** was the rifle with which the German army fought through World War I. It was a Mauser rifle first produced in 1898, but was based on a design dating back to 1888. In service the Mauser action proved sturdy and reliable, but in the years following 1918 the German army carried out a great deal of operational analysis that demonstrated that the Gewehr 98 was really too long and bulky for front-line use. As an immediate result the surviving Gewehr 98s underwent a modification programme that changed their designation to **Karabiner 98b**. *Karabiner* is the German for carbine, but there was nothing of the carbine in the Karabiner 98b, whose length was unchanged from that of the original Gewehr 98. The only changes were to the bolt handle, the sling swivels and the ability to use improved ammunition. To confuse matters further the original Gewehr 98 markings were retained.

The Karabiner 98b was still in service with the German army in 1939 (and remained so throughout the war), but by then the standard rifle was a slightly shorter version of the basic Mauser known as the **Karabiner 98k**. This was slightly shorter than the original Gewehr 98 but was still long for a carbine, despite the letter suffix 'k' standing for *kurz*, or short. This rifle was based on a commercial Mauser model known as the **Standard** and widely produced throughout the inter-war years in countries such as Czechoslovakia, Belgium and even China. The German version was placed in production in 1935 and thereafter made in very large numbers. At first the standard of production was excellent, but once World War II had started the overall finish and standards fell to the extent that by the end of the war the wooden furniture was often laminated or of an inferior material, and such items as bayonet lugs were omitted. All manner of extras were evolved by the gadget-minded Germans for the Karabiner 98k, including grenade-launching devices, periscopic sights and folding butts for weapons used by airborne troops. There were also variations for sniper use, some with small telescopic sights mounted half way along the forestock and others with larger telescopes mounted over the bolt action.

Despite all the innovations by the Germans during World War II, the Karabiner 98k was still in production as the war ended, looking not all that different overall from the original Gewehr 98, other than in the rough finish resulting from wartime shortages of labour and materials. By that time the Germans had to hand a whole array of Mauser rifles drawn from nearly all the armies of Europe, and most of them were used to equip one arm or another of the services by 1945. Some of these Mausers, most of which were very similar to the Gewehr 98 or Karabiner 98k, were kept in production on Czech and Belgian lines for German use after 1939-40. Away to the east the Chinese armies were mainly equipped with the Mauser Standard rifles that were virtually identical to the Karabiner 98k.

There will always be arguments as to whether or not the Mauser rifles were better service rifles than the Lee-Enfield, M1903 Springfield or the M1 Garand, but although the Mausers lacked some of the overall appeal of the Allied rifles they provided the German forces with long and reliable service. Few remain in use, but many are still prized as collector's pieces and many are retained for match rifle use.

The Karabiner 98k was a slightly shortened version of the Gewehr 98 which served Germany in World War I, and although supposedly a carbine the weapon was as long as many rifles of the period.

Wehrmacht soldiers train for combat, armed with Karabiner 98k rifles. The photograph was probably taken between the wars, as indicated by the old and new pattern helmets being worn at the same time.

Left: Digging in during the early stages of the war. The length of the Mauser-designed 98k is obvious, making it difficult to handle in confined spaces. Given the short combat ranges typical of World War II, the long-range performance of the 98k was largely superfluous.

Specification
Gewehr 98
Calibre: 7.92 mm (0.312 in)
Length: 1.25 m (49.2 in)
Length of barrel: 740 mm (29.1 in)
Weight: 4.2 kg (9.26 lb)
Muzzle velocity: 640 m (2,100 ft) per second
Magazine: 5-round box

Specification
Karabiner 98k
Calibre: 7.92 mm (0.312 in)
Length: 1.1075 m (43.6 in)
Length of barrel: 600 mm (23.6 in)
Weight: 3.9 kg (8.6 lb)
Muzzle velocity: 755 m (2,477 ft) per second
Magazine: 5-round box

GERMANY

Gewehr 41(W) and Gewehr 43

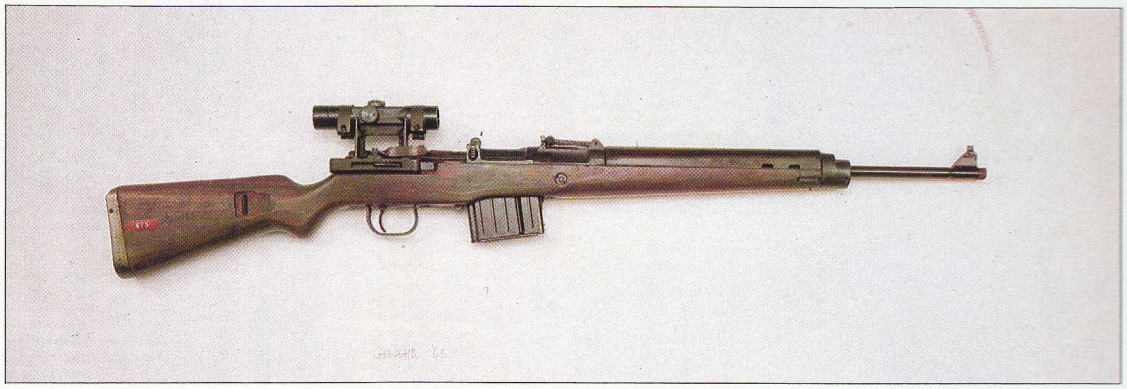
The German army maintained an overall 'quality control' section that constantly sought ways in which the German forces could increase their efficiency, and by 1940 this section had discovered a need for some form of self-loading rifle to improve combat efficiency. A specification was duly issued to industry, and Walther and Mauser each put forward designs that proved to be remarkably similar. Both used a method of operation known as the 'Bang' system (after its Danish designer), in which gases trapped around the muzzle are used to drive back a piston to carry out the reloading cycle. Troop trials soon proved that the Mauser design was unsuitable for service use and it was withdrawn, leaving the field free for the Walther design which became the 7.92-mm (0.312-in) **Gewehr 41(W)**.

Unfortunately for the Germans, once the Gewehr 41(W) reached front-line service, mainly on the Eastern Front, it proved to be somewhat less than a success. The Bang system proved to be too complex for reliable operation under service conditions and it was really too heavy for comfortable use, making the weapon generally unhandy. The Gewehr 41(W) also proved to be difficult to manufacture and, as if all this was not enough, in action the weapon proved to be difficult and time-consuming to load. But for a while it was the only self-loading rifle the Germans had and it was kept in production to the extent of tens of thousands

Most of the Gewehr 41(W)s were used on the Eastern Front, and it was there that the Germans encountered the Soviet Tokarev automatic rifles. These used a gas-operated system that tapped off gases from the barrel to operate the mechanism, and once this system was investigated the Germans realized that they could adapt it to suit the Gewehr 41(W). The result was the **Gewehr 43**, which used the Tokarev system virtually unchanged. Once the Gewehr 43 was in production, manufacture of the Gewehr 41(W) promptly ceased. The Gewehr 43 was much easier to make and it was soon being churned out in large numbers. Front-line troops greatly appreciated the ease with which it could be loaded compared with the earlier rifle and it was a popular weapon. All manner of production short-cuts were introduced into the design, including the use of wood laminates and even plastics for the furniture, and in 1944 an even simpler design known as the **Karabiner 43** was introduced, the *Karabiner* designation being adopted although the

overall length was reduced by only some 50 mm (2 in).

Both the Gewehr 41(W) and the later Gewehr 43 used the standard German 7.92-mm (0.312-in) cartridge, and were in no way related to the assault rifle programme that involved the 7.92-mm *kurz* cartridge. The retention of the rifle cartridge enabled the Gewehr 43 to be used as a very effective sniper rifle, and all examples had a telescopic sight mount fitted as standard. The Gewehr 43 was so good in the sniper role that many were retained in Czech army service for many years after the war.



Specification
Gewehr 41(W)
Calibre: 7.92 mm (0.312 in)
Length: 1.124 m (44.25 in)
Length of barrel: 546 mm (21.5 in)
Weight: 5.03 kg (11.09 lb)
Muzzle velocity: 776 m (2,546 ft) per second
Magazine: 10-round box

Specification
Gewehr 43
Calibre: 7.92 mm (0.312 in)
Length: 1.117 m (44 in)
Length of barrel: 549 mm (21.61 in)
Weight: 4.4 kg (9.7 lb)
Muzzle velocity: 776 m (2,546 ft) per second
Magazine: 10-round box

Developed from the Gewehr 41(W) and influenced by the Tokarev, the Gewehr 43 was fitted with telescopic sights as standard, and was an excellent sniper's rifle.

GERMANY

Fallschirmjägergewehr 42

The FG 42, an early model of which is seen here, was an attempt to arm the German parachute forces with a rifle capable of providing full-power MG performance.

Above: A drill book photograph of the FG 42 being fired in the prone position wth bipod folded. The FG 42 was a precursor of the modern-concept assault rifle.

In the strange world of Nazi Germany internal strife and rivalry flourished (was even fostered), and in no sphere was this internal feuding more rife than between the German army and the Luftwaffe. By 1942 the Luftwaffe were encroaching on the preserves of the army to an alarming extent for no other reason than petty wrangling, and when the army decided to adopt a self-loading rifle the Luftwaffe decided that it too had to have such a weapon. Instead of following the path followed by the army with its adoption of the *kurz* round, the Lufwaffe decided instead to retain the standard 7.92-mm (0.312-in) rifle cartridge and asked Rheinmetall to design a weapon to arm the Luftwaffe parachute troops, the *Fallschirmjäger*.

Rheinmetall accordingly designed and produced one of the more remarkable small-arms designs of World War II. This was the 7.92-mm (0.312-in) **Fallschirmjägergewehr 42** or **FG 42**, a weapon that somehow managed to compress the action required to produce automatic fire into a volume little larger than that of a conventional bolt action. The FG 42 was certainly an eye-catching weapon, for the first examples had a sloping pistol grip, an oddly-shaped plastic butt and a prominent bipod on the forestock. To cap it all there was a large muzzle attachment and provision for mounting a spike bayonet. The ammunition feed was from a side-mounted box magazine on the left, and the mechanism was gas-operated. All in all the FG 42 was a complex weapon, but was not innovative as it was an amalgam of several existing systems.

Needless to say the Luftwaffe took to the FG 42 avidly and asked for more. They did not get them, for it soon transpired that the novelties of the FG 42 had to be paid for in a very complex manufacturing process that consumed an inordinate amount of time and production facilities. Thus supply was slow and erratic, and in an attempt to speed production some simplifications were added. A simpler wooden butt was introduced and the pistol grip was replaced by a more orthodox component. The bipod was moved forward to the muzzle and other short-cuts were introduced. It was to no avail, for by the time the war ended only about 7,000 had been made. But it was after the war that the FG 42 made its biggest mark, for many of its design features were incorporated into later designs. Perhaps the most important of these was the gas-operated mechanism which could fire from a closed bolt position for single-shot fire and from an open bolt for automatic fire, all compressed into a relatively small space.

One thing that was not copied was the side-mounted magazine. This proved to be less than a success in action for not only did it snag on clothing or other items but it tended to unbalance the weapon when fired.

The FG 42 was a highly advanced design for its day and it incorporated many of the features now used on many modern assault rifles. Typical of these was the use of a 'straight line' layout from butt to muzzle and the gas-operated mechanism already mentioned. But for all this the FG 42 was too difficult to produce, and even by 1945 there were still some bugs that remained to be ironed out before the weapon was really problem-free. But for all that it was a truly remarkable design achievement.

Specification
FG 42
Calibre: 7.92 mm (0.312 in)
Length: 940 mm (37 in)
Length of barrel: 502 mm (19.76 in)
Weight: 4.53 kg (9.99 lb)
Muzzle velocity: 761 m (2,500 ft) per second
Magazine: 20-round box
Cyclic rate of fire: 750-800 rpm

First operational use of the FG 42 was in Skorzeny's daring commando raid to free Mussolini. Special camouflage smocks were worn for the raid, and the usual* Fallschirmjäger *helmets were worn.

GERMANY

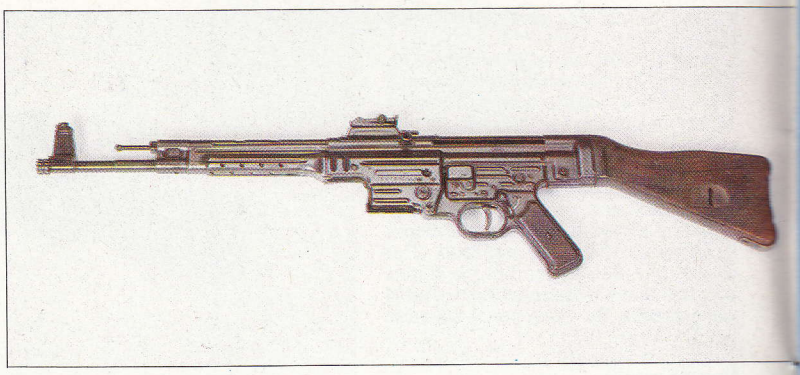
Maschinenpistole 43 and Sturmgewehr 44

Despite the orders of Hitler, the German army was so determined to develop and use the assault rifle that had been developed by Louis Schmeisser to fire the new Polte *kurz* (short) 7.92-mm (0.312-in) cartridge that it hid the experimental work under a new name. Originally the new rifle/cartridge combination had been known as the **Maschinenkarabiner 42(H)** (the H was for Haenel), but to distract attention once Hitler had issued his ill-advised order it was changed to **Maschinenpistole 43**, or **MP 43**. With the weapon in this form, the army went ahead from the development to the production stage, and the first examples were rushed to the Eastern Front where they soon proved to be invaluable.

The SS were among the first units to acquire the MP 43, and many were used in the battle of the Ardennes. First combat use was probably on the Eastern Front, however, where the weapon was an immediate success.

The full development story of the MP 43 is provided elsewhere, but it must be stressed that the MP 43 was the first of what are today termed assault rifles. It could fire single shots for selective fire in defence, and yet was capable of producing automatic fire for shock effect in the attack or for close-quarter combat. It was able to do this by firing a relatively low-powered round that was adequate for most combat ranges but which could still be handled comfortably when the weapon was producing automatic fire. Tactically this had a tremendous effect on the way the infantry could fight, as they were no longer dependent on supporting fire from machine-guns, being able to take their own personal support fire with them. This enabled the German infantry to become a far more powerful force because of the quantum increase in firepower that units could produce compared with those equipped with conventional bolt-action rifles.

Once the importance of this firepower increase had been fully realized, the MP 43 became a priority weapon and urgent requests for more and more were made by the front-line troops. Initial supplies went mainly to elite units, but most went to the Eastern Front where they were most needed. Unusually for wartime Germany, priority was given to production rather than development, and the only major change to the design was the **MP 43/1** which had fittings for a grenade-launching cup on the muzzle. In 1944 Hitler rescinded his opposition to the MP 43 and bestowed the more accurate designation of **Sturmgewehr 44 (StG 44)** upon the weapon, but there were few if any production alterations to the basic design.



Developed to fire the lower-powered Kurz (short) 7.92-mm round, the MP 43 was the first of the modern assault rifles. The lower-powered round followed German combat analyses, which found that battles were usually fought at ranges which did not require high-power bullets.

Some accessories were produced for the MP 43 series. One was an infrared night sight known as *Vampir*, but one of the oddest items ever to be produced for any weapon was the *Krummlauf* curved barrel that could direct bullets around corners. Apparently this device was developed to clear tank-killing infantry squads from armoured vehicles, but it was a bizarre device that never worked properly and yet managed to absorb a great deal of development potential at a time when that potential could have been directed towards more rewarding things. The curved barrels were intended to direct fire at angles of between 30° and 45°, and special periscopic mirror sights were devised to aim their fire. Few were actually produced and even fewer were used operationally.

After the war large numbers of MP 43s were used by several nations such as Czechoslovakia, and were also used during some of the early Arab-Israeli conflicts. A few still turn up in the hands of 'freedom fighters' in Africa and elsewhere.

Specification

StG 44
Calibre: 7.92 mm (0.312 in)
Length: 940 mm (37 in)
Length of barrel: 419 mm (16.5 in)
Weight: 5.22 kg (11.5 lb)
Muzzle velocity: 650 m (2,132 ft) per second
Magazine: 30- round box
Cyclic rate of fire: 500 rpm

USSR

Tokarev rifles

The Soviets have developed over the years a considerable talent for small arms innovations, and accordingly they were early in the move towards self-loading rifles. The first of these was the **Avtomaticheskaia Vintovka Simonova** introduced in 1936 (and thus known also as the **AVS36**) and designed by one S. G. Simonov. Although many were made and issued for service, the AVS was not a great success for it produced a prodigious muzzle blast and recoil, and it was all too easy for dust and dirt to get into the rather complex mechanism. The AVS thus had but a short service life before it was replaced.

The **SVT38 (Samozariadnyia Vintovka Tokareva)** that in 1938 replaced the AVS was designed by F. V. Tokarev, and it was initially not much of an improvement on the AVS. It was a gas-operated weapon, like the AVS, but in order to keep the rifle as light as possible the mechanism was far too light for the stresses and strains of prolonged use. While the combination of a gas-operated system and a locking block cammed downwards into a recess in the receiver base proved basically sound, it gave rise to frequent troubles mainly because parts broke. Thus the SVT38 was removed from production during 1940 to be replaced by the

Continued on page 1286

Above: The SVT 40 was an early Soviet self-loading rifle, usually issued to NCOs or marksmen. A most influential weapon, it was to lend features to the German MP 43, and was the start of a chain leading to the modern AK range.

Right: Marines of the Soviet Northern Fleet in defensive positions, probably on exercise near Murmansk. The nearest marine has a PPSh 41 sub-machine gun, the remainder being armed with SVT40 Tokarevs.

Development of the German Assault Rifle

World War II saw a revolutionary development in the type of personal weapon carried by private soldiers. Self-loading rifles had become familiar in the 1930s, but it was German wartime experience that was to spearhead future design of the rifle.

For a nation usually in the vanguard of military innovation the Germans were surprisingly slow in the development of automatic or self-loading rifles. A few tentative attempts to produce an automatic rifle had been made by the Germans during World War I, but the results were hardly a great success and the designs were dropped in the inter-war years. However, out of the mass of operational analysis carried out by various sections of the German General Staff came the realization that most infantry combat took place at ranges well under 400m (437 yards) but that the infantry were carrying rifles firing cartridges intended for use at ranges well over 1000m (1,095 yards). If the infantry had weapons firing lower-powered cartridges, not only would they be able to carry more ammunition, but the prospect of automatic fire also seemed possible.

Not much was done as the result of this research until 1934, when a new cartridge began a programme of development. By late 1940 the new round was ready, and this became generally known as the *kurz* or short cartridge for it resembled a conventional 7.92-mm (0.312-in) cartridge shortened and containing less propellent; it lacked the range of the full-size round, but at most expected combat ranges was more than effective.

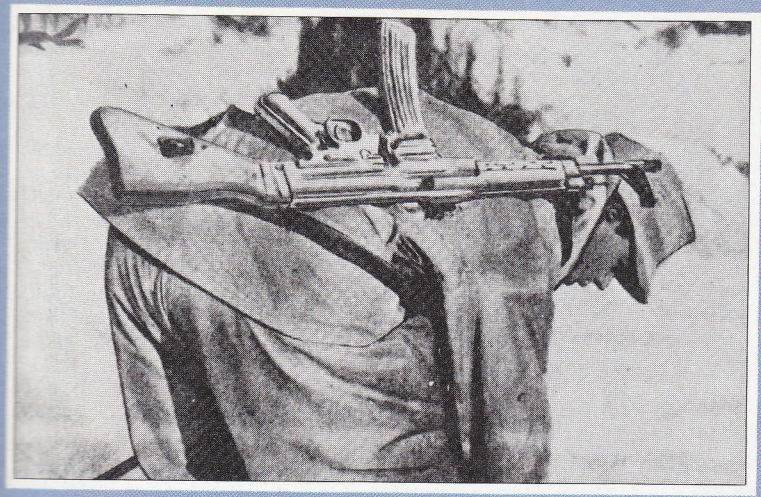
Even before the cartridge development was complete specifications for a new 'machine carbine' to fire the new round had been issued to industry. Two designs resulted, one from Walther and the other from Haenel, where the chief designer was Louis Schmeisser. These were the 7.92-mm (0.312-in) Maschinenkarabiner 42(W) and Maschinenkarabiner 42(H) respectively. Troop trials soon demonstrated that the Haenel weapon was the better of the two and the go-ahead for full production was given. According to legend the Haenel design showed its promise when a batch was dropped by parachute to an isolated unit of German soldiers who had been surrounded by the Soviets. Using the new weapon they fought their way out and in the aftermath the German army became enthusiastic about the assault rifle.

But at this point the heavy hand of Hitler descended, the Führer forbidding any further development of the new rifle and its short round. No doubt he had an eye to ammunition supply as not only were there millions of conventional 7.92-mm (0.312-in) rounds stockpiled ready for use, but the production facilities for yet more was ready and to hand; introduction of a new cartridge would impose considerable logistic and production burdens. Not to be outdone, the staff planners simply ignored the order and initiated production of the new rifle under the designation Maschinenpistole 43 (machine pistol model 1943) and the type went into full-scale production. The front line troops waxed lyrical regarding the new rifle as it provided them with a vast increase in potential firepower, and the rifle itself proved sound and easy to use. Using mainly simple metal stampings for its construction, the MP 43 could be produced relatively quickly and cheaply, and it seemed to be the ideal weapon for the conditions on the Eastern Front where most of the MP 43s were sent.

After a while the army was making so many demands for the new rifle that Hitler came to hear of it once more. Despite his initial order he overlooked the disobedience of the staff planners, and even bestowed the rifle with a new name. It became the Sturmgewehr 44 (assault rifle model 1944), but there was no real change from the original design which was produced by Haenel at Suhl, Walther at Zella-Mehlis, the Steyr Group and the Sauer-Gruppe at Suhl. Demand always outstripped supply.

December 1944, and in the misty Ardennes an SS soldier waves others forward. The lighter weight of bullet for the StG 44 he carries enables him to carry more rounds, and the automatic fire capability gives any size unit great firepower.

Meanwhile the Luftwaffe watched all these developments with some trepidation: if the army was getting an assault rifle, the Luftwaffe field troops had to have one as well. But there was little chance of the Luftwaffe ever getting any of the *kurz* rounds for their formations, so any design produced for them had to use the normal rifle cartridge. Rheinmetall duly settled to the task in its usual innovative fashion, and eventually came up with the Fallschirmjägergewehr 42, one of the more remarkable weapons of World War II. The FG 42 proved to work very well indeed (and its ingenious gas-operated mechanism was destined to be used in many post-war weapon designs), but the weapon itself could make little impact on the events of World War II. The FG 42 proved to be expensive and slow to produce, and by the time the war ended only about 7,000 had been issued. In contrast the MP 43 and the later StG 44 were churned out in the tens of thousands and made an impact out of all proportion to the numbers involved in many infantry scraps.



A German Gebirgsjäger (mountain trooper) adjusts his skis with his StG 44 assault rifle across his back. The StG 44 gave such troops extra firepower, but was almost 25 per cent heavier than a bolt action rifle.

Such was the demand for assault rifles that suitable captured weapons were employed if available in sufficient numbers. The US M1 carbine proved popular with the Germans, mainly for its ease of handling.

SVT40 in which the same basic mechanism was retained, but everything was made much more robust and the result was a much better weapon. However, the SVT40 suffered from the same problems as the AVS and the SVT38 in that the weapon had a fierce recoil and considerable muzzle blast. To off-set these effects at least partially, the SVT40 was fitted with a muzzle brake, initially with six ports but eventually with two. These muzzle brakes were of doubtful efficiency.

In order to get the best from the SVT40 the weapon was usually issued only to NCOs or carefully trained soldiers who could use their rapid fire potential to good effect. Some were fitted with telescopic sights for sniper use. A few weapons were converted to produce fully-automatic fire as the **AVT40**, but this conversion was not a great success and few were made. According to some accounts there was also a carbine version but this probably suffered excessively from the heavy recoil problem and again only a few were made.

When the Germans invaded the Soviet Union in 1941 they soon encountered the SVT38 and the SVT40. Any they could capture they promptly used under the designation **Selbstladegewehr 258(r)** and **Selbstladegewehr 259(r)**, but once the basic gas-operated mechanism was examined it was promptly copied and incorporated into the Gewehr 43.

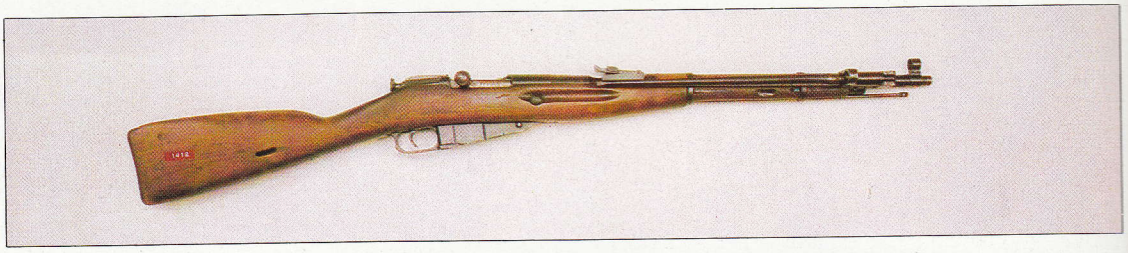
Soviet production of the SVT40 continued almost until the end of the war. Although there were never enough produced to meet demands, the SVT40 had a considerable influence on future Soviet small-arms development for it initiated a series of automatic rifles that eventually culminated in the AK-47 series. It also made a considerable impact on Soviet infantry tactics for the SVT40 demonstrated the importance of increased firepower for the infantry, a factor later emphasized by the introduction of the German MP 43 on the Eastern Front.

Specification
SVT40
Calibre: 7.62 mm (0.3 in)
Length: 1.222 m (48.1 in)
Length of barrel 625 mm (24.6 in)
Weight: 3.89 kg (8.58 lb)
Muzzle velocity: 830 m (2,723 ft) per second
Magazine: 10-round box

Soviet Marines of the Baltic Fleet prepare for one of their many amphibious assaults on German positions along the Baltic coast. Armament includes PPSh 41s, SVT40s and a Degtyayrov LMG.

USSR

Mosin-Nagant rifles



When the Russian army decided to adopt a magazine rifle to replace its Berdan rifles during the late 1880s, it opted for a weapon combining the best features of two designs, one by the Belgian Nagant brothers and the other a Russian design from a Captain Mosin. The result was the **Mosin-Nagant Model 1891** with which the Tsarist army fought its last battles up to 1917. The Model 1891 was then adopted by the new Red Army following the 1918 upsets, and it remained in use for many years thereafter.

The Model 1891 fired a 7.62-mm (0.3-in) cartridge and it was a sound but generally unremarkable design. The bolt action was rather complicated and the ammunition feed used a holding device that offered only one round under spring tension to the bolt for reloading. But for all this it was a sound enough weapon, although rather long. This was mainly to increase the reach of the rifle when fitted with the long socket bayonet, which was almost a permanent fixture once the user was in action. The bayonet had a cruciform point that was used to dismantle the weapon.

The original Model 1891s had their sights marked in arshins, an archaic Russian measurement equivalent to 0.71 m (27.95 in), but after 1918 these sights were metricated. In 1930 there began a programme to modernize the old rifles, and all new rifles were produced in a new form. This new form was the **Model 1891/30**, which was slightly shorter than the original and had several design points introduced to ease production. It was the Model 1891/30 that was the main Red Army service rifle of World War II and the one used with telescopic sights as a sniper's rifle. Other 'extras' included a grenade-launching cup and a silencer.

A Red Army private at about the time of the Winter War with Finland in the winter of 1940. He is armed with the 1930 model of the Mosin-Nagant, a dragoon-length version of the rifle.

The Mosin-Nagant weapons were also produced in carbine form for cavalry and other uses. The first of these was the **Model 1910**, followed much later by the **Model 1938** (the Model 1891/30 equivalent). In 1944 the **Model 1944** was introduced, but this was only a Model 1938 with a permanently fixed folding bayonet alongside the forestock.

The Mosin-Nagant rifles were also used by the Finns (**m/27** shortened Model 1891, **m/28/30** with altered sights, and re-stocked **m/39**), the Poles (**karabin wz 91/98/25**) and also by the Germans. The Germans captured piles of ex-Soviet rifles during 1941 and 1942, and many were issued by the Germans to their own second-line garrison and militia units. Most of these were Model 1891/30s redesignated **Gewehr 254(r)**, but by 1945 even Model 1891s were being issued to the hapless Volkssturm units under the designation **Gewehr 252(r)**. Many units along the Atlantic Wall were issued with the Model 1891/30.

A Model 1938 Mosin-Nagant carbine. This model, like the 1930, was simplified for ease of manufacture, and was issued to the cavalry. A great many were captured by Germany in the early war years.

With the introduction of the automatic rifle in the post-war years the old Mosin-Nagant rifles were swiftly removed from Red Army use. Some were sold on the open market but most appear to have been stockpiled. Only the short and handy carbines now remain in service today, many in China and the Far East. Many still turn up in the hands of 'freedom fighters'.

Specification
Model 1891/30
Calibre: 7.62 mm (0.3 in)
Length: 1.232 m (48.5 in)
Length of barrel: 729 mm (28.7 in)
Weight: 4 kg (8.8 lb)
Muzzle velocity: 811 m (2,660 ft) per second
Magazine: 5-round box

Specification
Model 1938 carbine
Calibre: 7.62 mm (0.3 in)
Length: 1.016 m (40 in)
Length of barrel: 508 mm (20 in)
Weight: 3.47 kg (7.6 lb)
Muzzle velocity: 766 m (2,514 ft) per second
Magazine: 5-round box

The Lee-Enfield Story

Dating from the last years of the 19th century, the Lee-Enfield has had a longer service career than most of its contemporaries, having seen action in the Boer War and, in largely unaltered form, more than 80 years later in the hands of Afghan tribesmen. Its tough, rugged reliability and ease of maintenance will ensure the Lee-Enfield's survival for many years to come.

The first Lee-Enfield rifle was approved for production during late 1895. It was almost identical to the Lee-Metford that it replaced, but the main difference was that the new rifle incorporated a new and more effective form of barrel rifling. The change was made possible by the introduction of a new smokeless propellant that burned much more cleanly than the old form of cordite, allowing a more efficient rifling profile to be adopted. This rifling was developed at the Royal Small Arms Factory at Enfield Lock to the north of London.

The name Lee in the new rifle's designation came from one James Paris Lee, an American with a penchant for introducing new small arms and principles. One of his greatest successes was the bolt action that was embodied in the Lee-Enfield rifles and the form of box magazine that was for many years used on them. His basic designs had been adopted by the Royal Small Arms Factory and were developed over the years to a high degree of efficiency. Many small arms experts believe that the Lee-Enfields were the best bolt-action service rifles ever made.

The first combination of the Lee rifle with the Enfield rifling was known as the Lee-Enfield Mark I. In common with many other designs of the period it was a long weapon capable of use at ranges of up to 1645m (1,800 yards). It was also thought to be capable of effective employment at ranges well over this by the use of a form of auxiliary sight on the side of the forestock. This sight was not meant for use by an individual but for controlled firing by sections or even platoons in order to cover an area with fire. This method of fire was not effective unless the users were both highly trained and drilled, but it was a method that was retained in the drill books until the 1930s, although by then the practice was hardly used.

In common with well-established then current practice, a short carbine version of the Lee-Enfield Mark I was produced for cavalry use, and there was even a special variant for use by the police in Ireland.

It was the Lee-Enfield with which the British army fought throughout the Boer War, and many hard lessons were learned during the prolonged period of guerrilla warfare that followed the early pitched battles. The hardy Boers were able to inflict many lessons in musketry on the conventionally drilled British soldiers, and after the war some of these lessons were put to a practical application. One lesson learned was that the provision of a special rifle for infantry and a special rifle for cavalry was an unnecessary luxury. It was clearly far better to have a slightly shorter rifle for use by all arms, and that included the Royal Navy as well. In 1902 a new shorter version of the Lee-Enfield was ready and this was put through various troop trials.

This new design was the Short, Magazine Lee-Enfield Mark I, soon known as the SMLE. But the weapon had a very rough ride during its early days. Needless to say neither the infantry or the cavalry liked the weapon at all: it was widely felt by the infantry that the shorter barrel would mean a loss in long-range accuracy, and the cavalry felt that the SMLE was too long for its requirements. But the design stuck. Over the period up to 1907 all manner of detail changes were incorporated until the point was reached where the Mark III emerged. This was the classic Lee-Enfield and, despite all the unpleasant things said about it at the time of its introduction, it went on to be a world-beater which was used throughout two world wars and many other more minor conflicts and skirmishes.

A brief description of the Mark III will suffice for all the later marks. Starting at the muzzle, this was surrounded by a metal cap with a boss

The SMLE (Short, Magazine, Lee-Enfield) was still in service at the start of the war, when it was known as the No. 1 Rifle. Troops are seen house-clearing, possibly on exercise.

Canadian troops in Italy in 1944. The rifle is the No. 4, which was introduced as a replacement for the original SMLE. Street fighting was a dangerous pastime, and it was wise to deposit a calling card such as a grenade before entering a building.

and lug for mounting a long blade bayonet. Two 'ears' on top of this cap protected the foresight, while the whole length of the barrel was surrounded by the wooden forestock. Halfway along the barrel was a band carrying the forward sling swivel, and farther back along the barrel were the rear sights, set on top of the forestock. The rear sights were calibrated in 200-yard (183-m) intervals from 200 yards (183m) up to 2,000 yards (1830m). The long-range fire sight was mounted to the left of these rear sights. Behind the barrel was the bolt action, which by the time the Mark III was ready had been developed to a high degree of efficiency: as the firer lifted the bolt handle and pulled it to the rear the spent cartridge case was pulled from the chamber and ejected as it struck a fixed post; as he pushed it forward, the

Left: In the ruins of Caen, Allied troops had to take particular care as the rubble provided excellent cover for snipers. This corporal, armed with a No. 4, is using a drawbridge as a vantage point while keeping watch.

Below: Normandy, July 1944; the Allies have been ashore for a month and a half, and in the Odon Valley British troops have dug in. Seasoned campaigners by now, when given a chance to sleep, they sleep!

bolt picked up the next cartridge and propelled it forward into the chamber while recocking the firing spring at the same time. The rifle was then ready to fire if the safety catch (to the left of the bolt) was forward. It was easy to see if the rifle was loaded and ready to fire by a glance at the bolt catch, which would be to the rear if it was cocked. The 10-round box magazine was under the bolt action and worked together with a device known as a 'cut-out'. With the cut-out in place the loaded magazine was separated from the bolt action: the idea was that to conserve ammunition only single rounds would be loaded into the bolt action by hand, leaving the full magazine to be used when some form of emergency arose, whereupon the cut-out would be withdrawn to allow the magazine to be used. The rounds were loaded into the magazine using clips each holding five rounds. This clip was placed in a charger bridge guide over the bolt action, after which a quick push from the thumb would load all five rounds in one move. If required the magazine could be easily removed for loading by hand. The wooden butt had a metal butt trap (containing an oil bottle and a cord 'pull-through' for cleaning and maintaining the rifle), and the rear sling swivel was under the butt.

Most of the features mentioned above were common to all later Lee-Enfields, but once World War I got under way some short cuts had to be introduced to speed production. One of the first features to go was the long-range sight, although the mounting plate was often retained. On some examples the magazine cut-out was removed, and several production expedients were introduced to more minor components. This made the rifle the SMLE Mark III*, and this version was produced not only by several British factories but also by arsenals in India and Australia. The Australian factory continued production of the Mark III right up to 1957 as the Australians never adopted later versions.

Three members of the 8th Rifle Brigade make their way forward somewhere in north west Europe in 1944. The riflemen have fixed bayonets, and the Bren gunner in the centre is ready for immediate action.

It was during the years from 1914 to 1918 that the Lee-Enfields revealed themselves as the excellent service rifles they were. During 1914 the highly-trained British Expeditionary Force (BEF) was able to use aimed rapid fire to such an extent that at times the advancing German

UK

Rifle No. 4 Mark I

Although the old Lee-Enfield No. 1 Mark III rifle performed sterling service throughout World War I, it was an expensive and time-consuming weapon to produce as every example had virtually to be made by hand. In the years after 1919 consideration was given to a version of the basic design that could be mass-produced, and in 1931 a trial series of rifles known as the No. 1 Mark VI was produced. These were accepted as suitable for service, but at the time there were no funds to launch production, so it was not until November 1939 that the go-ahead was given for what was then redesignated the **Rifle No. 4 Mark I**.

The No. 4 Mark I was designed from the outset for mass-production, and differed from the original No. 1 Mark III in several respects: the No. 4 Mark I had a much heavier barrel that improved overall accuracy; the muzzle protruded from the forestock by an easily recognizable amount and provided the No. 4 Mark I with a definite recognition point; and the sights were moved back to a position over the receiver, which made them easier to use and also provide a longer sighting base, again an aid to accuracy. There were numerous other small changes, most of them introduced to assist production, but for the soldier the biggest change was to the muzzle, where a different fitting was introduced for a new bayonet, which was a light and simple spike with no grip or anything like it, so depriving the soldier of one of his favourite front-line tools. The spike bayonet was not liked, but being simple and easy to produce it was retained in use for many years.

The first No. 4 Mark Is were issued for service during late 1940, and thereafter the type supplemented the old No. 1 Mark IIIs. But during the war years the No. 1 Mark III was never entirely replaced. This was not for lack of production effort, for the No. 4 Mark I was churned out in hundreds of thousands by numerous small arms production facilities all over the UK and even in the USA. These 'American' rifles were produced at the Stevens-Savage plant at Long Branch and were known as the **No. 4 Mark I*** as they differed in the manner in which the bolt could be removed for cleaning. These American examples also differed in various other small details, most of which were introduced to assist production using American methods.

In service the No. 4 Mark I proved itself an excellent weapon, to the extent that many now regard the design as one of the finest of all service rifles of the bolt-action era. It was capable of withstanding even the roughest handling, and could deliver accurate fire for prolonged periods. It was relatively easy to strip and keep clean using the 'pull-through' carried inside the butt trap along with an oil bottle and a few pieces of the famous 'four by two' cleaning rag.

Special sniper's versions of the No. 4 were also produced. These used various types of telescopic sight over the receiver along with a special butt plate. These rifles were usually selected from production examples and were virtually rebuilt and restocked before issue. They were designated **Rifle No. 4 Mark I(T)**.

The No. 4 Mark I is still in widespread service around the world.

A No. 4 Mk I rifle dating from 1941 (top). The No. 4 was a simplified version of the No. 1, or SMLE (below). Major differences include deletion of the nose cap, relocation of the rear sight and redesign of the foresight.

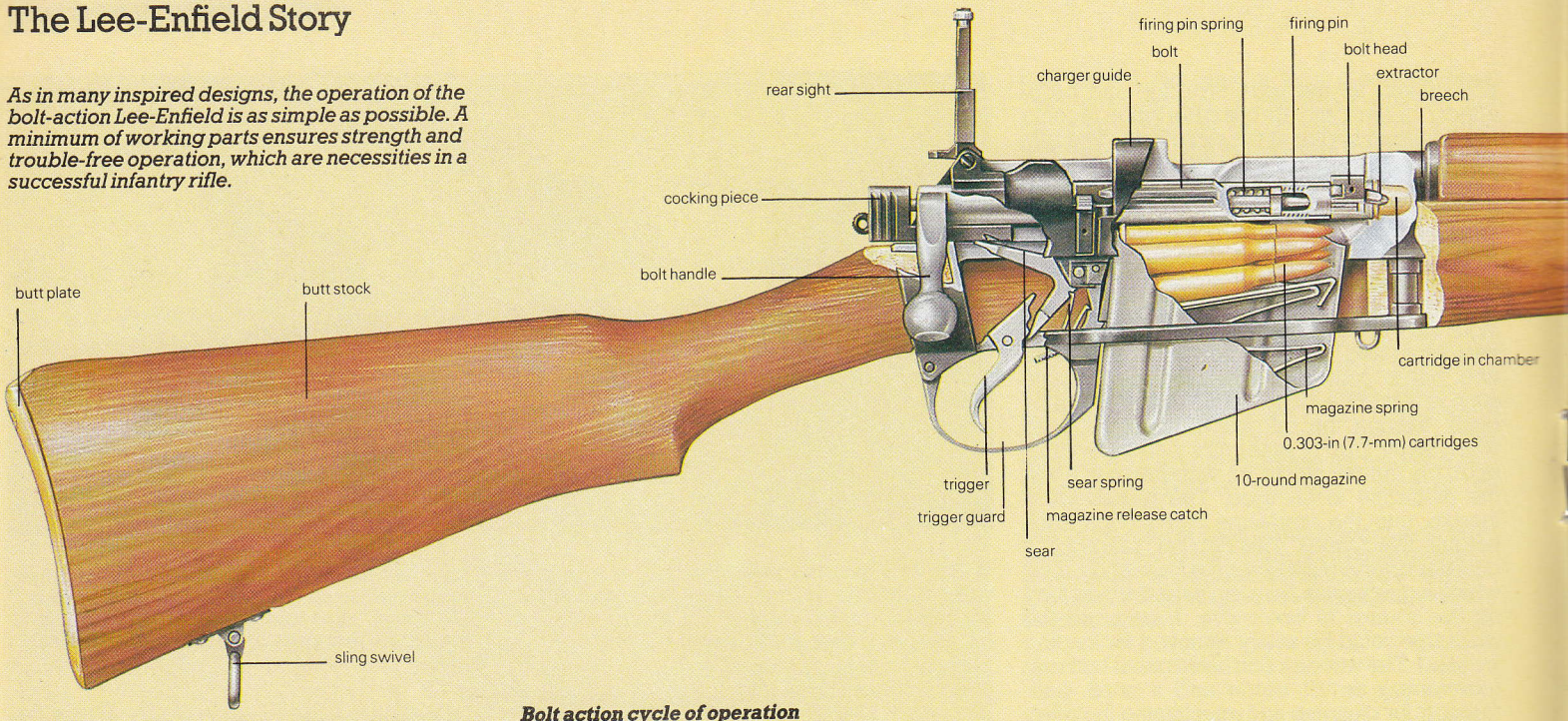
Many current service examples have been rebarreled with new 7.62-mm (0.3-in) barrels, and more have been converted to match or hunting rifles.

Specification

Rifle No. 4 Mark I
Calibre: 0.303 in (7.7 mm)
Length: 1.129 m (44.43 in)
Length of barrel: 640 mm (25.2 in)
Weight: 4.14 kg (9.125 lb)
Muzzle velocity: 751 m (2,465 ft) per second
Magazine: 10-round box

The Lee-Enfield Story

As in many inspired designs, the operation of the bolt-action Lee-Enfield is as simple as possible. A minimum of working parts ensures strength and trouble-free operation, which are necessities in a successful infantry rifle.



formations thought they were under massed machine-gun fire, but by late 1915 the BEF was no longer in existence. Instead the war settled down to a long period of trench warfare in the most appalling conditions. The SMLE was able to keep firing through even the most hostile weather and mud conditions the trenches could inflict. Soldiers of many nations learned to keep the bolt action free of mud by wrapping it in a piece of cloth, and the muzzle was kept free of dirt at all times. Many sniper and periscopic sights were used with the SMLE, and even worn or old rifles were kept in use by converting them to launch rifle grenades.

Once World War I was over it was realized that good as the SMLE proved, in any future conflict ease of production would be of paramount importance. For all its attributes the Mark III and Mark III* were expensive and time-consuming weapons to make as every one had to be made virtually by hand with every component carefully machined and finished to suit a set of sealed gauges and tools. In order to speed any future production a new Lee-Enfield design was proposed and in 1926 and after a new type of weapon was introduced.

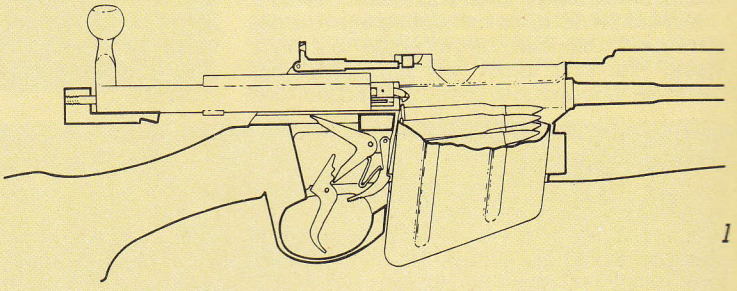
Design frozen

During the 1920s the old SMLE Mark III and Mark III* had become the Rifle No.1 Mark III and Mark III*. The new design became the Rifle No.1 Mark VI, and later the No.4 Mark I once all the details had been settled. The final design was frozen in 1931, but at that time there was no prospect of any procurement so it was set aside ready for the time when a need might arise.

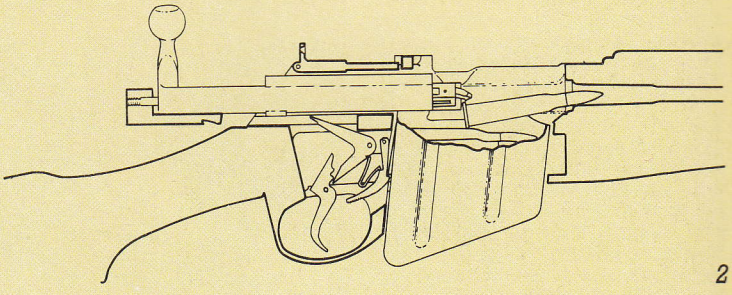
That need duly came in 1939. The 'new' design was put into production and it turned out to be even better than the original. In the changes introduced to assist production were several new features. One was a heavier barrel which greatly enhanced accuracy, and the relocation of the sights to a position back to over the bolt action also provided a longer sighting base and added to this improved accuracy. Some features such as the long-range sights and the cut-out were removed altogether as they were deemed no longer necessary, and in place of the old blade bayonet a new and short spike

Bolt action cycle of operation

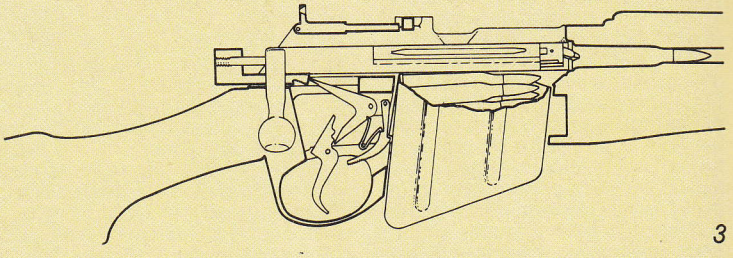
***1** Full withdrawal of the bolt assembly allows the spring-loaded magazine to feed a cartridge into line with the bolt.*



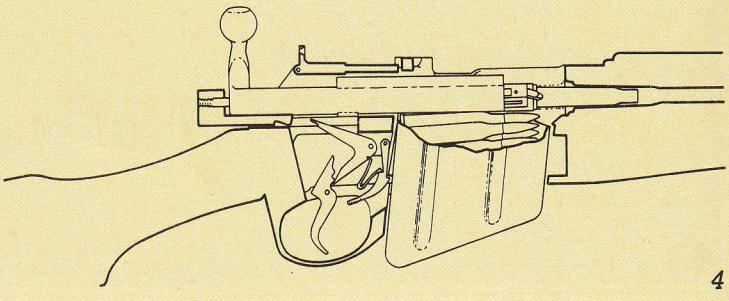
***2** Forward pressure on the bolt engages the cartridge, and feeds it into the breech.*

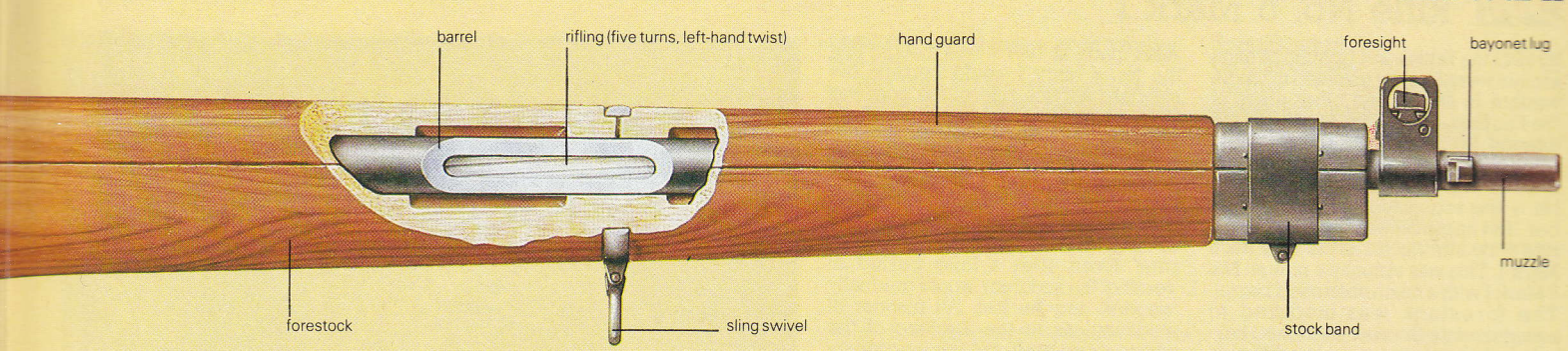


***3** In the last fraction of travel forward, the bolt engages the trigger sear, cocking the weapon. Rotating the bolt locks the cartridge into the breech. Pressure on the trigger will now fire the rifle.*



***4** On release of the bolt, a claw on the bolt head engages the rim of the cartridge and withdraws the spent case. The spring-loaded extractor ejects the case once this is clear of the breech. The cycle then restarts.*





bayonet was introduced to fit over the length of barrel that now protruded from the forestock.

As the war progressed the new No.4 gradually replaced the old No.1s though even by the time the war was over in 1945 the No.1 was still around. It is still around in very large numbers in such countries as India, for the Indian arsenal at Ishapore churned out the No.1 throughout the two world wars. Even in the United Kingdom the BSA works continued to produce No.1 right up until 1944. It was, and still is, an excellent service rifle by any account.

The No.4 was also an excellent service rifle, and by service rifle it must be understood that it is a rifle that is handled by soldiers, not by highly trained marksmen. The average soldier can usually manage to hit an obvious target at service ranges, but is rarely called upon to produce expert fire at the extreme ranges once considered essential by marksmen of the old Bisley school. A service rifle has to be very hardy, easy to clean and to maintain, easy to load, and rapid in action. The Lee-Enfields were all of these things, and they continue to function even under the direst of physical conditions.

They continue to give good service to this day. Even when the British army started to turn to automatic self-loading rifles in the 1950s, the Lee-Enfields did not vanish from the scene. Instead many were reworked to accommodate the new semi-rimmed 7.62-mm (0.3-in) NATO cartridge in place of the old 7.7-mm (0.303-in) round. There are several forms of rifle in this new calibre. One is the L8, a straightforward conversion of the No.4; another is the L39A1, used for match-and target-firing; and another is the L42A1, a special sniper's version.

All Lee-Enfield rifles have been used for sniping at some time or another, usually with a telescopic sight. Over the years there have been several versions, but the current L42A1 with its improved cartridge is probably better than any of them.

This account of the Lee-Enfield cannot mention every separate variant that has seen service, for that would fill a book and there are already several on the market that accomplish the task very well. No mention of the various 5.56-mm (0.22-in) training rifles has been made and reference to the No.5 'jungle carbine' will be found elsewhere. But one thing that must be repeated is that the Lee-Enfield has long been an excellent service rifle, and so long as it remains in widespread service all over the world it will continue to demonstrate its sterling qualities for many years to come. It will probably be around well into the next century.

Above: 14 January 1945, and a reconnaissance patrol of the 6th Airborne Division pauses in the snow of the Ardennes. The rifleman is equipped with telescopic sights for his No. 4, but the leading soldier is using an improved Sten sub-machine gun, the Mk V.

Right: Fighting in the jungles of Burma, the XIV Army often felt like forgotten men. By 1945, however, modern equipment was getting through for the final victorious stages of the Burma campaign, and No. 4 rifles were replacing SMLEs.

UK

Rifle No. 5 Mark I

By 1943 the British and Commonwealth armies were heavily involved in jungle warfare in Burma and other areas of the Far East, and for the conditions the existing No. 1 and No. 4 Lee-Enfield rifles proved to be too long and awkward in use. Some form of shortened No. 4 was requested, and by September 1944 approval was given for such a rifle to be introduced as the **Rifle No. 5 Mark I**. This was virtually a normal No. 4 Mark I with a much shortened barrel. The forestock was modified to accommodate the new shortened barrel, and the sights were modified to reflect the decreased range performance of the new barrel. There were two other modifications introduced as well, both of them associated with the short barrel: these were a conical muzzle attachment that was meant to act as a flash hider, and a rubber pad on the butt. Both had to be introduced as the shortening of the barrel gave rise to two unwanted side effects: the prodigious muzzle flash produced by firing a normal rifle cartridge in a short barrel, and the ferocious recoil produced by the same source.

In a normal long rifle barrel most of the flash produced on firing is contained within the barrel and so are some of the recoil forces. In a shortened barrel a good proportion of the propellant gases are still 'unused' as the bullet leaves the muzzle, hence the added recoil. The soldiers did not like it one bit but they had to admit that in jungle warfare the No. 5 Mark I was a much handier weapon to carry and use. They also welcomed the reintroduction of a blade-type bayonet that fitted onto a lug under the muzzle attachment. In fact, following on from the first production order for 100,000 rifles made in 1944 it was thought that the No. 5 Mark I would become the standard service rifle of the post-war years, despite all the recoil and flash problems. But this did not happen.

The No. 5 Mark I had one built-in problem, quite apart from the flash and recoil, and that problem was never eradicated. For a reason that was never discovered the weapon was inaccurate. Even after a long period of 'zeroing' the accuracy would gradually 'wander' and be lost. All manner of modifications to the stocking of the weapon was tried, but the inaccuracy was never eliminated and the true cause was never discovered. Thus the No. 5 was not accepted as the standard service rifle, the No. 4 Mark I being retained until the Belgian FN was adopted in the 1950s. Most of the No. 5s were retained for use by specialist units such as those operating in the Far East and Africa, and many are still in use in those areas by various armies.

Specification

Rifle No. 5 Mark I
Calibre: 0.303 in (7.7 mm)
Length: 1.003 m (39.5 in)
Length of barrel: 476 mm (18.75 in)
Weight: 3.25 kg (7.15 lb)
Muzzle velocity: about 730 m (2,400 ft) per second
Magazine: 10-round box

Developed specifically for jungle operations, the No. 5 rifle was not an unqualified success, having a vicious recoil. It saw action in Kenya and Malaya (shown here), as well as at the end of World War II.

UK

De Lisle carbine

The **De Lisle** carbine was one of the more unusual weapons of World War II but very little has ever been written on the subject. The weapon was designed by one William Godfray De Lisle who was, in 1943, an engineer in the Ministry of Aircraft Production. During that period he patented a silencer for a 5.59-mm (0.22-in) rifle, and this attracted the attention of persons interested in producing silent weapons for use during the commando raids which were then being conducted around the coasts of occupied Europe.

Further development of the basic De Lisle silencer resulted in a drastic modification of a Lee-Enfield No. 1 Mark III rifle to accommodate the firing of an 0.45-in (11.43-mm) pistol cartridge. The basic bolt action was retained, but in place of the large box magazine a small magazine casing was substituted. Forward of the bolt action was the silencer itself, and this comprised a series of discs held within a tubular housing that allowed the gases produced on firing to 'swirl' around before they were discharged from ports around the muzzle. Firing the subsonic 0.45-in (11.43-mm) pistol cartridge with this silencer system produced very little noise at all, and even this sounded quite unlike a firearm being discharged. There was also no flash.

The first De Lisle carbines were produced in one of the tool rooms of the Ford works at Dagenham. From there the early prototypes were taken for field testing in commando raids along the north French coast. They proved themselves remarkably successful, and even these early weapons were used in what was to be their main operational role, a form of silent sniping to pick off sentries or other personnel during the early stages of a raid. As the De Lisle carbine fired a pistol cartridge its maximum effective range was limited to 250 m (275 yards), but this was usually more than enough for raids carried out on dark nights.

With trials successfully completed, a production order for 500 carbines was placed and this was later increased to 600. The 'production' programme of modifying the Lee-Enfield rifles was carried out by the Sterling Armament Works, also in Dagenham, but when the programme got under way things had changed.

By the time the De Lisle carbines

Some folding stocked De Lisles (top) were used in the Far East, having been designed for paratroops. The early model (below) has been cut away to show the silencer mechanism.

were being produced it was mid-1944 and the invasion of Europe had taken place. With the Allies safely ashore there was far less need for a silenced commando weapon and the order was cancelled. By then about 130 had been completed and issued, but as they lacked a role in Europe most were sent to the Far East, where they were used by specialist units in Burma and elsewhere. Many were retained in the area after the war to see action once more during the Malayan Emergency. Some of these weapons did not have the solid butt of the earlier weapons, having instead a metal butt that folded under the weapon. This version had originally been produced for parachute troops, but only a small number was ever made.

Very few De Lisle carbines now exist, even in the most comprehensive small-arms collections. Most of them appear to have been destroyed during the post-war years, probably as the result of their potential as assassination weapons.

Specification
De Lisle carbine
Calibre: 11.43 mm (0.45 in)
Length: 895 mm(35.25 in)
Length of barrel: 184 mm (7.25 in)
Weight: 3.74 kg (8.25 lb)
Muzzle velocity: 253 m (830 ft) per second
Magazine: 7-round box

JAPAN

Rifle Type 38

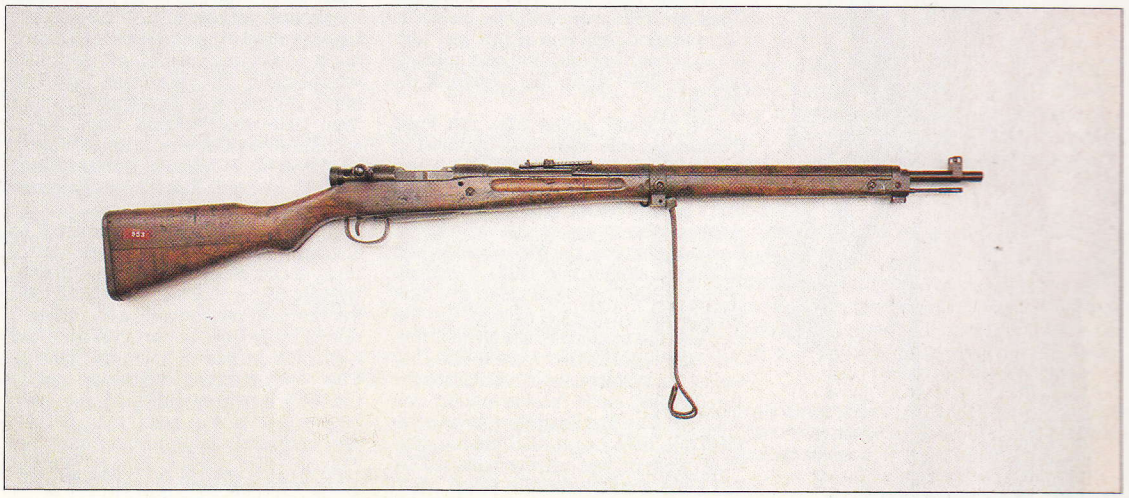
The **Rifle Type 38** was adopted for Imperial Japanese service in 1905 and was a development of two earlier rifles selected by a commission headed by one Colonel Arisaka, who gave his name to a whole family of Japanese service rifles. The Type 38 used a mixture of design points and principles taken from contemporary Mauser and Mannlicher designs, mixed with a few Japanese innovations. The result was a sound enough rifle that had a calibre of 6.5 mm (0.256 in). This relatively small calibre, coupled with a rather low-powered cartridge, produced a rifle with a small recoil that exactly suited the slight Japanese stature.

This fact was further aided by the Type 38 being a rather long rifle. When the rifle was used with a bayonet, as it usually was in action, this gave the Japanese soldier a considerable reach advantage for close-in warfare, but it also made the Type 38 a rather awkward rifle to handle. As well as being used by all the Japanese armed forces, the Type 38 was exported to such nations as Thailand, and was also used by several of the warring factions then prevalent in China. At one point during World War I the Type 38 was even purchased as a training weapon by the British army.

A shorter version, the **Carbine Type 38** was widely used, and there was a version with a folding butt for use by airborne troops. There was also a version of the Type 38 known as the **Sniper's Rifle Type 97** which, apart from provision for a telescopic sight, had a revised bolt handle.

During the 1930s the Japanese gradually adopted a new service cartridge of 7.7-mm (0.303-in) calibre, and the Type 38 was revised as the **Rifle Type 99**. The Type 99 had several new features, including a sight that was supposed to be effective for firing at aircraft, and a folding monopod to assist accuracy. A special paratroop model that could be broken down into two halves was devised but proved to be unreliable so it was replaced by a 'taken down' version known as the **Parachutist's Rifle Type 2**. Not many of these were made.

Once the Pacific war was under way in 1942 the production standards of Japanese rifles and carbines deteriorated rapidly; any items that could be left off were so, and simplifications were introduced onto the lines. But overall standards went down to the point where some of the late production examples were virtually lethal to the user, many of them being constructed from very low-quality raw materials, both wood and metal, for the simple reason that the Allied blockade and air raids prevented the use of anything better. By the end the arsenals were reduced to producing very simple single-shot weapons firing 8-mm (0.315-in) pistol cartridges, or even black-powder weapons. There was even a proposal to use long bows and crossbows firing explosive arrows. It was all a long way from the days when the Type 38 was one of the most widely used service rifles in the Orient.



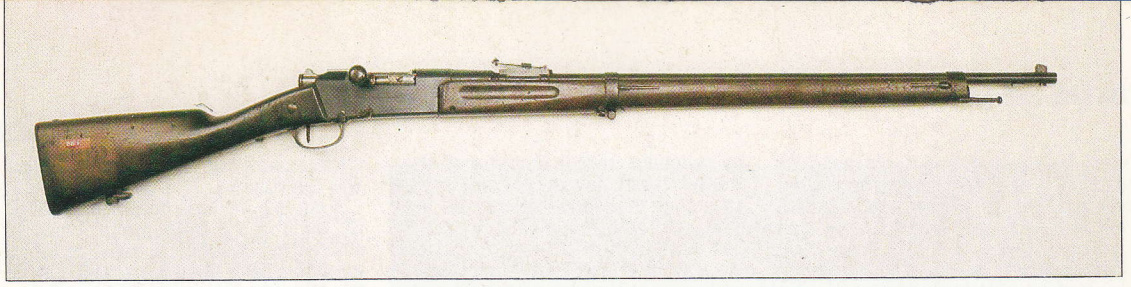
The Type 99 was a monopod fitted version of the Type 38 employing the new 7.7-mm (0.303-in) calibre cartridge. The Japanese design utilized contemporary Mauser and Mannlicher features, and first appeared in 1905.

Specification
Rifle Type 38
Calibre: 6.5 mm (0.256 in)
Length: 1.275 m (50.2 in)
Length of barrel: 797.5 mm (31.4 in)
Weight: 4.2 kg (9.25 lb)
Muzzle velocity: 731 m (2,400 ft) per second
Magazine: 5-round box

Japanese infantry assault the Yenanyaung oilfields in Burma. The great length of the Arisaka type rifle, especially with bayonet attached, is obvious. This made the weapon awkward to handle but gave the generally short-statured Japanese soldier an effective reach in close combat.

FRANCE

Lebel and Berthier rifles



In 1939 the French army was equipped with an almost bewildering array of rifles, for the French appear to have adopted a policy of never throwing anything away. Some of them could trace their origins back to the mle 1866 Chassepot rifle. One of them, the **Fusil Gras mle 1874**, was still only a single-shot weapon, but was still in use with some French second-line and colonial units in 1940 when the Germans invaded.

The original Lebel rifle, the **Fusil d'infanterie mle 1886**, was updated in 1893 to produce the **mle 1886/93**. It was with this Lebel rifle that the French army fought World War I, but another weapon also in use at that time was a Berthier carbine, the **Mousqueton mle 1890** (and similar **mle 1892**), a version of the original mle 1886 allied to a new Mannlicher magazine system. On the Berthier the magazine was of the orthodox box type loaded from a clip, but the Lebel system used a tubular magazine holding more rounds loaded one at a time. The first Berthier rifle was the **Fusil mle 1907**, but in 1915 this colonial-troop weapon was largely replaced by the **Fusil d'infanterie mle 07/15**. With the introduction of the mle 07/15 the older Lebel rifles gradually faded in importance as production concentrated on the Berthiers, but the Lebels were never replaced in service. They just soldiered on, and were still available in 1939.

A Muslim Spahi of the 1st Moroccan Spahi regiment of the Vichy colonial army is armed with the old Lebel rifle. Note the long bayonet in his belt.

The original Berthier magazine system held only three rounds, but it was soon realized that this was not enough and the **Fusil d'infanterie mle 1916** had a 5-round magazine. To complicate matters further there were carbine or other short versions of all the models mentioned above, and to complicate matters still further the French sold or gave away masses of all of these weapons in the inter-war years to many nations who promptly applied their own designations. Thus Lebel and Berthier rifles turned up not only in all the French colonies but in nations such as Greece, Yugoslavia, Romania and other Balkan states.

In 1934 the French decided to attempt to make some sense out of their varied rifle and carbine arsenal by adopting a new calibre. Up till then the normal French calibre had been 8 mm (0.315 in), but in 1934 they adopted a smaller calibre of 7.5 mm (0.295 in). That same year they started to modify the old Berthier rifles to the new calibre and at the same time fitted a new magazine (still holding only five rounds) and several other changes along with the new barrel. This 'new' version was the **Fusil d'infanterie mle 07/15 M34**, but the change-over programme went so slowly that in 1939 only a small proportion of the available stocks had been converted, ensuring that all the other models were still in use.

After the events of May and June 1940 the Germans found masses of all the various French rifles on their hands. Some they could use as they were, and many were issued to garrison and second-line formations. But many others were stockpiled, to be dragged out in 1945 to arm Volkssturm and other such units. No doubt the Germans found that the array and variety of French rifle and carbine types were too much, even for their assorted stocks, but as they never had enough rifles to arm their ever-growing forces the French weapons were no doubt handy.

Some of the rifles in French reserve use in 1939 were obsolete 1886 models, unaltered from their introduction to service. They were outmoded within 10 years.

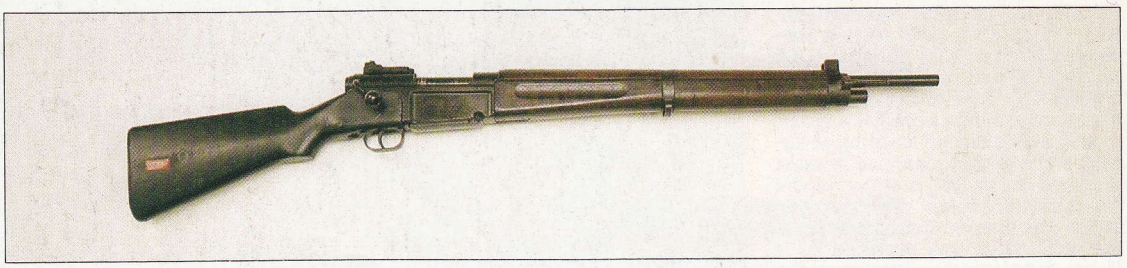
Few of the old French rifles are to be encountered today other than in the hands of museums and collectors. Most of them were museum pieces even in 1939 and only the general unpreparedness of France for war ensured that the relics were retained.

Specification
mle 1886/93
Calibre: 8 mm (0.315 in)
Length: 1.303 m (51.3 in)
Length of barrel: 798 mm (31.4 in)
Weight: 4.245 kg (9.35 lb)
Muzzle velocity: 725 m (2,380 ft) per second
Magazine capacity: 8-round tube

Specification
mle 1907/15 M34
Calibre; 7.5 mm (0.295 in)
Length: 1.084 m (42.7 in)
Length of barrel: 579 mm (22.8 in)
Weight: 3.56 kg (7.85 lb)
Muzzle velocity: 823 m (2,700 ft) per second
Magazine capacity: 5-round box

FRANCE

Fusil MAS36



In the period following World War I the French army decided to adopt a new standard service cartridge with a calibre of 7.5 mm (0.295 in). The new cartridge was adopted in 1924, but following some low-priority and therefore lengthy trials, it was found that the new cartridge was unsafe under certain circumstances and thus had to be modified in 1929. In that year the French decided to adopt a new rifle to fire the new round, but it was not until 1932 that a prototype was ready. Then followed a series of further trials that went on at a slow pace until 1936, when the new rifle was accepted for service.

The new rifle was the **Fusil MAS36** (MAS for Manufacture d'Armes de Saint-Etienne). This used a much-modified Mauser action which was so arranged that the bolt handle had to be angled forward quite sharply. The box magazine held only five rounds. The MAS36 had the odd distinction of being the last bolt-action service rifle to be adopted for military service anywhere (all later new weapons using some form of self-loading action) and in some other ways the MAS36 featured other anachronisms. In typical French style the weapon had no safety catch, and the overall appearance of the design belied its year of introduction, for it looked a much older design than it was.

Production of the new rifle was so slow that a modification programme to convert some of the old rifles for the new cartridge had to be undertaken. This lack of urgency was typical of the period for the nation seemed to suffer from an internal lethargy that could be traced back to the nation's exertions of World War I. Thus by 1939 only a relatively few French army units were equipped with the MAS36, and these were mainly front-line troops. The MAS36 could have had little effect on the events of May and June 1940, but many of the troops who left France at that time took their MAS36s with them and for a while it remained the favoured weapon of the Free French forces in exile. The Germans also took over numbers of MAS36s and used them under the designation **Gewehr 242(f)** for their own garrison units based in occupied France.

One odd variation of the basic MAS36 was a version known as the **MAS36 CR39**. This was a short-barrelled version intended for paratroop use, and had an aluminium butt that could swivel forward alongside the butt to save stowage space. Only a relative few were ever made, and even fewer appear to have been issued for service use.

When the war ended the new French army once more took the MAS36 into use and retained it for many years, using it in action in North Africa and Indo-China. Many are still retained for use as ceremonial parade weapons and the type is still used by the forces and police authorities of many colonial or ex-colonial states.

The MAS 36 was the last bolt action rifle adopted by a major army anywhere. It was a fair weapon, but few saw service before 1939.

Specification
MAS36
Calibre: 7.5 mm (0.295 in)
Length: 1.019 m (40.13 in)
Length of barrel: 574 mm (22.6 in)
Weight: 3.67 kg (8.09 lb)
Muzzle velocity: 823 m (2,700 ft) per second
Magazine: 5-round box

The Battles for Cassino

By the spring of 1944 the Italian campaign had reached a peak of savagery, with the Allies seeking to penetrate the Gothic line in the face of a tenacious German defence. The titanic struggle was to centre upon the town and the ancient monastery of Cassino, a name that was to become tragically famous.

Although it is now customary to refer to the Battle of Cassino, there were in fact four Battles for Cassino, all of them infantry battles. They were of the hard-slog type in which the battles of World War I were re-fought, and the casualty bill was as high as any between 1914 and 1918.

The Battles for Cassino had to be fought, for without them the Allies' northward advance up the leg of Italy would have ceased. Following the landing on the toe of Italy in September 1943 the Allies made relatively swift progress northwards, capturing Naples in the process. But as the Allies headed for Rome the Germans, although heavily outnumbered, carried out their usual skilful delaying tactics to buy time to build what was then the most powerfully defended line in Europe.

From the east to the west coasts of Italy the Germans built the Gothic Line. Using some of the most powerful defensive features that nature could supply, the Germans constructed a long line of defensive positions, both man-made and enhanced-natural, that created a major obstacle to the Allies. At no point along the Gothic Line was there any place where the Allies had even a remote chance of making any headway without a major attack in force against a strong defence. There was no way in which armoured forces could be used in the mountainous terrain that was used as the geographical basis for the line, so the Allies just had to depend on a series of set-piece battles of the mould typical of World War I in order to break through.

In only one place was there even a remote chance of breaking the line, and that was at Cassino in the Liri valley. Even here the town was protected by an artificially swollen river and numerous fortified positions, and overlooked by what became known as Monastery Hill with its Benedictine monastery forming a natural observation post to cover the country for many miles around. Such was the strength of the Gothic Line that even this fortress offered the best chance of Allied success, so it was Cassino or nothing.

If the strength of the Gothic Line was not enough, the Allies had to attack in the middle of the Italian winter. Winter in that part of Italy is a season of rains, cold and poor visibility, so the Allies had also to contend with the elements. Additionally, they were hampered by a long supply line that extended back across a large number of river crossings over which supplies had to be moved on Bailey or improvised bridging. The Italian campaign was both an engineer's and an infantry campaign.

The first Battle took place over a month during January and February 1944. It was very much a frontal attack and it soon stalled. The Allies found themselves attempting to advance directly into a well organized and stubborn defence. A direct frontal attack across the Liri by an American force in brigade strength turned into a major military disaster, and even when they managed to cross elsewhere the Allies found themselves faced with an almost sheer climb to the crest of Monte Cassino.

The infantry fighting during this first battle was typical of what was to follow. It would be pointless to go through every stage of the battles for they followed one from another in a disheartening sequence and with disheartening similarity. Each battle or action started with a bombardment of the German positions, bomber aircraft sometimes taking the place of artil-

Polish troops force their way up the steep slopes to Cassino. The Poles suffered great losses, attacking dug-in German defenders on such unforgiving ground.

Among the defenders of Cassino, the elite 'Hermann Goering' Fallschirmjäger *(parachute) division was prominent. Some are seen in the ruins of Cassino alongside an emplaced StuG III assault gun.*

lery. Then, following what appeared to be saturation coverage of the target, the infantry advanced, sometimes across water obstacles or up almost sheer mountain slopes, only to be cut down by defenders who struggled through the rubble to set up their machine-guns and were prepared to fight every step of the way. During the first battle it seemed that the American divisions were almost on the crest of the Cassino ridge above the town, but it was there that they were held and the position changed hands several times in the fighting that followed.

The Gothic Line was held by a variety of formations including two Panzer divisions. These Panzers could do little to influence the fighting directly, for the terrain was just as hostile to them as it was to the Allies, so the tanks were frequently used as pillboxes, often dug into strong buildings to provide added protection. The Germans also used a new ploy in the form of simplified Panther tank turrets set into steel boxes dug into specially chosen defensive positions. Most of these were inland from Cassino, up in the mountains, but where they were situated the Allies soon learned that there was no way in which they could make any headway. At no point where there was one of these dug-in turrets could the Allies break through at any stage of the battle. Prominent in the German defence of Cassino was the Luftwaffe's 1st Parachute Division, devoid of their parachutes since the invasion of Crete and fighting as infantry.

Members of General Mark Clark's 5th US Army move through Trocchio on the way to Cassino. The Americans almost took the town in the first battle during January and February 1944.

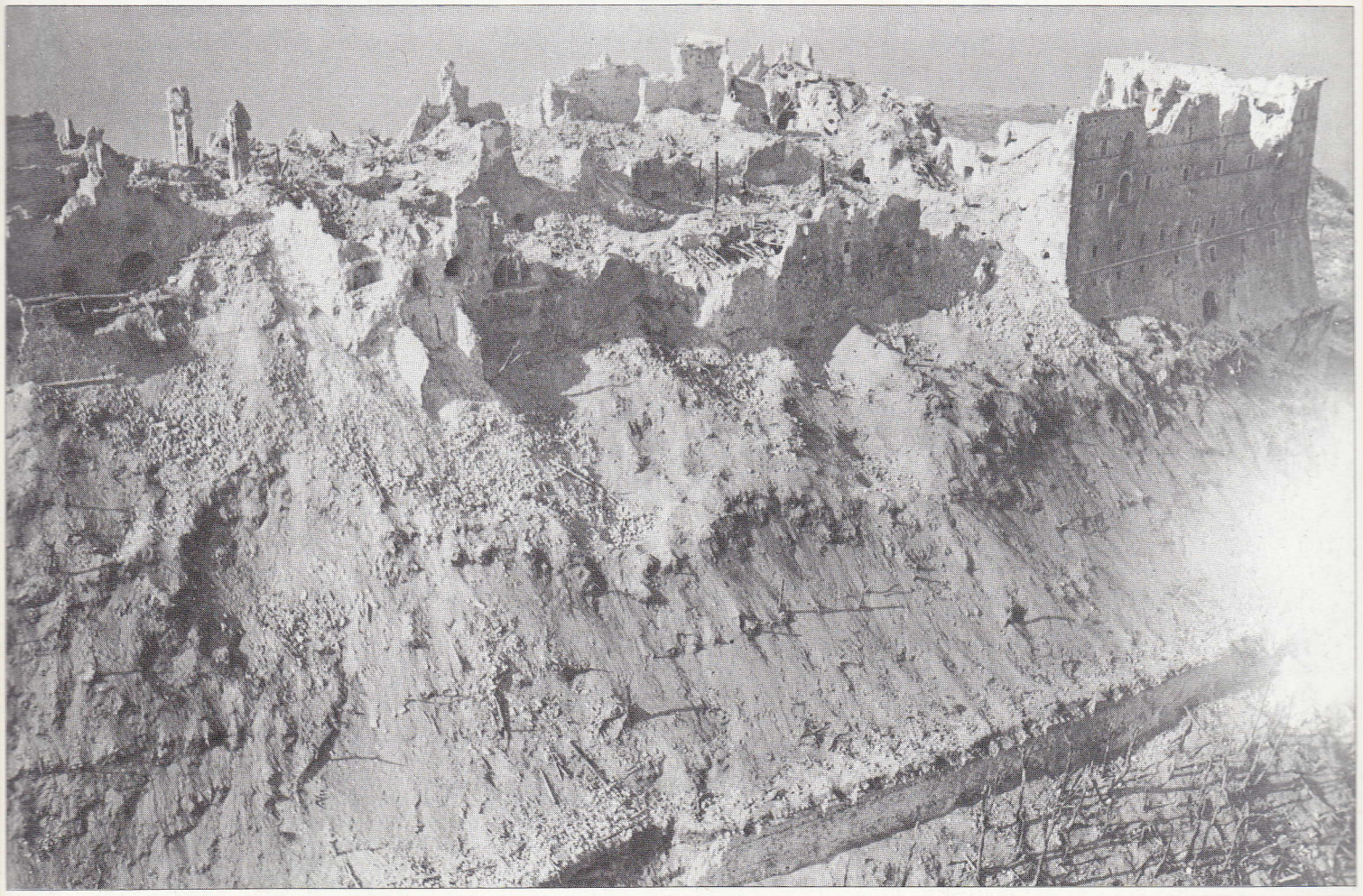
New Zealand troops force their way into shelter in the thick of the battle. The riflemen are equipped with bayonetted No. 1 (SMLE) rifles.

It was these paratroops who were in the thick of the fighting during the 2nd Battle, which opened in mid-February. This started with a bombing attack on the Monastery itself, which was utterly destroyed by precision bombing. Unfortunately for the Allies this proved to be a major mistake, for all it achieved was to turn the monastery from a strong position into an impregnable fortress. The German paratroops promptly moved into the debris, which they found to be an ideal defensive position, and there they remained. The rest of the battle evolved into the usual round of infantry attacks met with strong defensive fire, and even hand-to-hand fighting in some areas. What advances were made were later lost in the usual German counterattacks.

There followed a lull, mainly imposed by the weather which changed from bad to worse, preventing any operations. The 3rd Battle started on March 15 with a major aerial attack on the town of Cassino itself. In this bombing attack every structure in the town was either demolished or damaged in some way, and the waiting attackers believed that no one could be left alive in the inferno. But in the usual way, enough defenders did survive, and these managed to live through the artillery bombardment that followed the bombers. They managed to put up their usual spirited defence and delayed the bulk of the Allied attacks apart from one small operation in which a feature known as Castle Hill was taken. This hill was directly under Monastery Hill, and throughout that night the Germans made several attempts to retake the hill together with the old castle on the summit. In some of the most ferocious combat of all the Cassino actions the Germans were held off, but only at a fearful cost.

This 3rd Battle was noteworthy as it was the first major battle in which the Allies attempted to use tanks. The Shermans and Stuarts of the 2nd New Zealand Division managed to find a way through the rubble of the town itself and started to climb towards the summit. They could not get far without infantry support and had to turn back, but at last a foothold on Monte Cassino ridge had been made. Farther inland the Goumiers of General Juin's French Corps were making steady but unspectacular progress through the mountains using the time-honoured tactics and mule-carried supplies.

The 3rd Battle eventually came to a halt after only a week. Once again the defence had held, mainly because by that time it had been strengthened to the point where 23 German divisions faced 28 Allied divisions, a ratio very much in favour of the defence. The only way the Allies could really force their way through was



to mass an attacking force at one point and ram their way through. Thus the pattern for the 4th Battle was set. The Allies rearranged their forces to obtain a local superiority, and when the attack started in early May it was made by several divisions in place of the brigade-sized grouping that had been used earlier.

By the time the attacks started the winter weather was long past, and the infantry moved forward into the dust of an Italian summer. As usual the attack got under way with fire from massed artillery, over 1,600 guns in all, and as usual the Germans fought back as stubbornly as ever. But this time the Allies were attacking in overwhelming strength. In the mountains the French broke through the defences, and at Cassino itself the Polish II Corps surged forward to take the monastery. With the monastery taken the whole of the Gothic Line had been penetrated, for the old military adage that a mountain line was turned, once penetrated at any point, held just as true for the Gothic Line as for any other. With the Cassino ridge in Allied hands the way through to Rome was cleared. From 19 May onwards the Allies could once more resume their advance north and Rome was duly taken in early June.

The Battles for Cassino had lasted for five months. When it was over the town of Cassino resembled one of the villages on the Western Front of World War I. Whole areas around the town were shattered and the monastery itself was a heap of ruins. Between them the Allies and the Germans had suffered over 50,000 casualties, many of whom were never found; the British alone lost over 4,000 men 'missing'.

Above: At the conclusion of the battle, the monastery was taken by the Polish II Corps, although, as can be seen from the photograph, little was left standing after four months of battle and bombardment.

Below: Moroccan Goums of Marshal Juin's French Corps move through mountain territory in their successful penetration of the Gothic line. The French colonial forces made a great contribution to the campaign around Cassino.

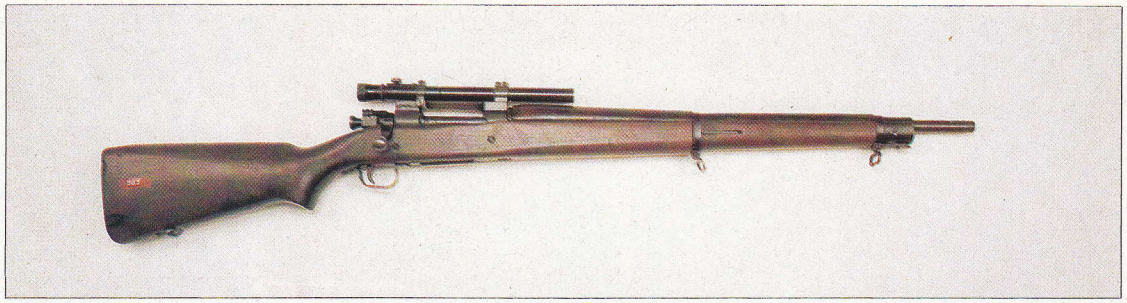
USA

Rifle, Caliber .30, Model 1903

In 1903 the US Army decided to replace its existing Krag-Jorgensen rifles and adopted a rifle based on the Mauser system. This rifle, officially known as the **US Magazine Rifle, Caliber .30, Model of 1903** (or **M1903**) was first produced at the famous Springfield Arsenal and has thus become almost exclusively known as the **Springfield**. It was produced to be a form of universal weapon that could be used by both infantry and cavalry, and was thus much shorter than most contemporary rifles, but it was a well-balanced and attractive rifle that soon proved itself to be a fine service weapon with an accuracy that makes it a prized target rifle.

Almost as soon as the M1903 was placed in production the original blunt-nosed ammunition was replaced by newer 'pointed' ammunition that is now generally known as the .30-06 (thirty-ought six) as it was an 0.3-in (7.62-mm) round introduced in 1906. This remained the standard US service cartridge for many years and is still widely produced. The original M1903 served throughout World War I in US Army hands, and in 1929 the design was modified slightly by the introduction of a form of pistol grip to assist aiming, and this became the **M1903A1**. The **M1903A2** was produced as a sub-calibre weapon for inserting into the barrels of coastal guns and was used for low-cost training on these guns.

When the USA entered World War II in 1941 the new M1 Garand rifle was not available in the numbers required, so the M1903 was placed back into large-scale production, this time as the **M1903A3**. This version was modified to suit modern mass-production methods, but it was still a well-made rifle. Some parts were formed by using stampings instead of machined parts, but the main change was to the sights which were moved back from over the barrel to a position over the bolt action.



Above: A Mauser patterned rifle, the M1903 Springfield proved a fine weapon, serving into the Korean war. The sniper version had a Weaver telescopic sight, and the conventional 'iron' sights have been removed entirely.

Right: The accuracy of the M1903 made it a popular weapon with sharpshooters, and in positions where a single well-aimed shot can be decisive the small box magazine of five rounds was no handicap.

The only other version of the M1903 (apart from some special match rifle models) was the **M1903A4**. This was a special sniper's version fitted with a Weaver telescopic sight, and was specialized to the point where no conventional 'iron' sights were fitted. Numbers of the M1903A4 were still in service during the Korean War of the 1950s.

The M1903 was used by several Allied armies during World War II. Many of the US troops who landed in Normandy on D-Day in June 1944 were still equipped with the Springfields, but by then many had been passed on to various resistance units in France and elsewhere, and the M1903 was a virtual standard issue to the various 'island watchers' among the Pacific islands. In 1940 some were sent to the UK to equip Home Guard units, and the type was even placed back into production to a British order, only for the order to be taken over for the use of US forces.

The M1903 and its variants may still be encountered today with a few small armed forces around the world. But many are also retained as target or hunting rifles, for the M1903 Springfield is still regarded as one of the classic rifles of all time. It is still a rifle that is a delight to handle and fire, and many are now owned by weapon collectors for those reasons alone.

Specification
M1903A1
Calibre: 7.62 mm(0.3 in)
Length: 1.105 m (43.5 in)
Length of barrel: 610 mm (24 in)
Weight: 4.1 kg (9 lb)
Muzzle velocity: 855 m (2,805 ft) per second
Magazine: 5-round box

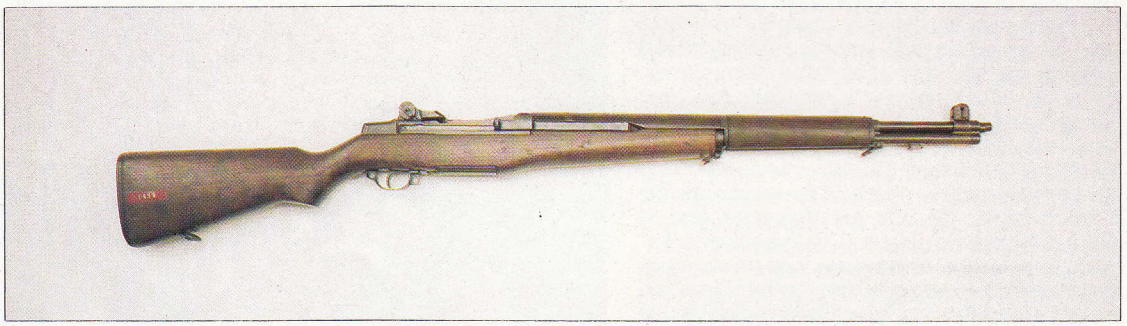
USA

Rifle, Caliber .30, M1 (the Garand)

One of the main distinctions of the **Rifle, Caliber .30, M1**, almost universally known as the **Garand**, is that it was the first self-loading rifle to be accepted for military service. That acceptance happened during 1932, but there followed a distinct gap before the rifle entered service as it took some time to tool up for the complex production processes demanded by the design. The rifle was created by John C. Garand, who spent a great deal of time developing the design to the point that once in production it required very few alterations. Thus the last M1 looked very much like the first.

As already mentioned, the M1 was a complicated and expensive weapon to manufacture, and required a large number of machining operations on many of the components. But it was a strong design and proved to be sturdy in action, although this was balanced in part by the weapon being rather heavier than comparable bolt-action designs. The M1 was a gas-operated weapon.

When the USA entered World War II at the end of 1941, most of her regular forces were equipped with the M1, but the rapid increase of numbers of men in uniform meant that the old M1903 Springfield rifle had to be placed back into production as a quick increase in the flow of M1s from the lines was virtually impossible, as a result largely of the tooling problems already mentioned. But gradually M1 production built up, and some 5,500,000 had been churned out by the end of the war; production was resumed during the Korean War of the early 1950s.



The Garand was the first self-loading rifle accepted as a standard military weapon. Strong and sturdy, the gas-operated M1 was rather heavier than the bolt action M1903 Springfield.

For the American forces the M1 Garand was a war-winner, whose strong construction earned the gratitude of many. But it did have one operational fault, namely its ammunition feed. Ammunition was fed into the rifle in eight-round clips, and the loading system was so arranged that it was possible to load only the full eight rounds or nothing. There was a further operational problem encountered when the last of the eight rounds was fired, for the empty clip was ejected from the receiver with a definite and pronounced sound that advertized to any nearby enemy that the firer's rifle was empty, sometimes with unfortunate results to the M1 user. This problem was not eliminated from the M1 until 1957, when the US Army introduced the M14 rifle which was virtually a reworked M1 Garand with an increased ammunition capacity.

Many sub-variants of the M1 were produced but few actually saw service as the basic M1 proved to be more than adequate for most purposes. There were two special sniper versions, the **M1C** and the **M1D**, both produced during 1944 but never in any great numbers. Each had such extras as a muzzle flash cone and butt plates.

The M1 attracted the attention of the

Continued on page 1300

The Role of the Sniper

It was an uneventful patrol. The enemy had gone from the sector, and the reconnaissance unit could afford to take it easy. Suddenly there was a shot, and the officer collapsed. Leaderless, the patrol fell back, and the well-concealed sniper relaxed. He had done his job.

During two world wars the sniper has managed to gain a reputation out of all proportion to the numbers involved, for the sniper is an individual who delivers deliberately aimed fire from positions that are hidden from the unfortunate target. Usually firing only a single shot and then moving on, the sniper can have an effect on an enemy where a single man can prevent movement, demoralize whole units and cause havoc by picking off officers and NCOs.

In order that he can use his personal rifle to best effect, the sniper almost invariably uses some form of telescopic sight, and the rifle with a telescope has become his trademark. But the use of a telescopic sight does not make a poor shot into a good one: all that the optical sight achieves is to make the target that much clearer for the sniper to take an accurate aim. But this does not mean that every sniper has to be a crack shot. Many snipers in both wars would be forced to admit that their marksmanship was only average. Where they differed from the normal infantryman was they were prepared to go to great lengths to make sure that when they fired they hit their target. This meant all manner of things other than sheer accuracy of fire. It also meant careful maintenance and handling of the rifle involved, a very high standard of fieldcraft and personal concealment, thorough and careful reconnaissance of an area before going into action, accurate map-reading, and personal discipline and conduct of a high degree.

Again contrary to expectation the sniper is not usually a loner. Instead he often worked as a member of a team. In some armies the sniper could (and often did) work alone, but more often snipers worked in teams of two men. One of the men used the rifle and made the required shot but the other man acted as an extra pair of eyes, usually using a powerful telescope or binoculars and often selecting the target. In order to keep both men on their toes mentally the roles were frequently exchanged.

The sniper's weapon was usually a version of the standard service rifle of the nation concerned. Sniper's rifles were usually carefully selected examples of production models, but some were built for the role from scratch. Any weapon selected was normally carefully re-stocked and fitted with the mountings for the telescopic sight, and was then subjected to a long and careful process of calibration and zeroing, hopefully by the individual who would use the rifle in action. Once ready for use the rifle was kept in a special strong case to prevent hard knocks and was at all times carefully handled and kept clean. Ammunition was also carefully selected from special production batches giving consistent performance.

By the end of World War II many snipers were already using a self-loading rifle. The self-loading function prevented unnecessary movement by the sniper and allowed bursts of rapid fire in the event of an emergency. Many nations did, however, stick to their well-tried bolt action rifles when a choice was possible.

National characteristics came out very noticeably among the various nations. The Germans approached sniping in a thorough and methodical way that often brought very good results. The Japanese made much use of their talent for novelty and personal concealment, but they often worked as individuals which could put them at a disadvantage. The Soviets made much of the results achieved by their numerous snipers, some of whom were claimed to have gained remarkable personal tallies, but later analysis has placed some of these claims in doubt. Some Red Army claims would, if true, have wiped out half the German army. The Americans made much good use of their national talent for accurate musketry, but they appear to have made only slight use of snipers on many fronts although after a period into the war they did produce some remarkable sniping teams. In contrast the British and many of the Commonwealth armies relied upon sheer hard work and thorough application to the sniper's task. The British tendency was to careful training of selected personnel rather than to the use of an individual's flair that was more prevalent in many other armies. Wherever the British infantry went sniping schools were established and the skills were developed. All too often the good sniper turned out to be not a marksman of the Bisley type, but a gamekeeper turned poacher who could make good use not only of his rifle but of the surroundings and the approach to a target; typically he was a man who put preparation before everything else. It was the careful man who made a good sniper, not a cowboy.

Well concealed in the rubble of a partially destroyed house, a British sniper aims his telescopically sighted No. 4 rifle. The modern British army rifle is a development of the same weapon.

US Marines on Tarawa are pinned down behind a sand dune, while a single Japanese sniper is operational. The value of snipers lies in the fact that a single man can hold down much larger units of the enemy.

Adequate camouflage is essential for the sniper, as his value can be lost if his position is too easily located. This Soviet sniper, armed with a Mosin-Nagant Model 1930, has just begun to move up a hill into position, being very careful not to skyline himself.

The sniper's version of the Lee-Enfield No. 4 rifle differs from the standard only in the addition of a cheek pad and telescopic sights. By the end of the war, however, many armies preferred self-loading rifles for their snipers, rather than bolt actions such as the No. 4.

USA's enemies to the extent that the Germans used as many as they could capture, with the designation **Selbstladegewehr 251(a)**, and the Japanese produced their own copy, the 7.7-mm (0.303-in) **Rifle Type 5**, but only prototypes had been completed by the time the war ended.

Post-war the M1 went on for many years as the standard US service rifle, and some are still issued to National Guard and other such units. Several nations continue to use the M1, and many designers have used the basic action as the basis for their own products: many of the modern Italian Beretta rifles use the Garand system as does the American 5.56-mm (0.22-in) Ruger Mini-14.

Specification
Rifle M1
Calibre: 7.62 mm (0.3 in)
Length: 1.107 m (43.6 in)
Length of barrel: 609 mm (24 in)
Weight: 4.313 kg (9.5 lb)
Muzzle velocity: 855 m (2,805 ft) per second
Magazine: 8-round box

Garand-armed infantrymen of the US 4th Armored Division are seen in action in the Ardennes during the drive to relieve Bastogne and the trapped 101st Airborne Division.

USA

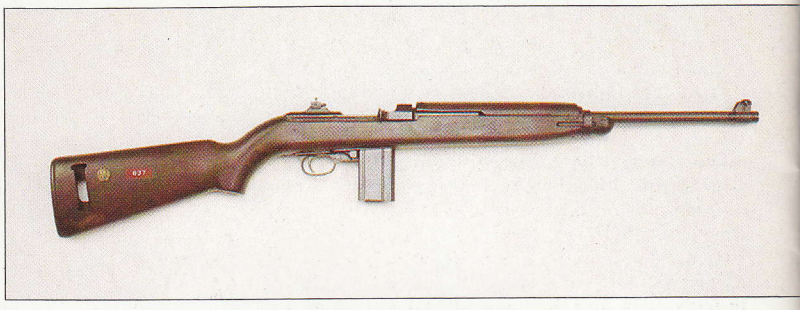
Carbine, Caliber .30, M1, M1A1, M2 and M3

The traditional weapon for second-line troops and such specialists as machine-gunners has generally been the pistol, but when the US Army considered the equipment of such soldiers during 1940 they made a request for some form of carbine that could be easily stowed and handled. The result was a competition in which several manufacturers submitted their proposals, and the winner was a Winchester design that was adopted for service as the **Carbine, Caliber .30, M1**. The M1 used an unusual gas-operated system and was designed for use with a special cartridge that was intermediate between a pistol cartridge and a rifle cartridge in power.

From the start the Carbine M1 was an immediate success. It was light and easy to handle, to the extent that its use soon spread from the second-echelon troops who were supposed to be issued with the weapon to front-line troops such as officers and weapon teams. In order to speed its introduction into service the M1 was a single-shot weapon only, but there was a special variant with a folding stock known as the **M1A1**. This was produced for use by airborne units. When time allowed later during the war the automatic fire feature was added. This version was known as the **M2**, and had a cyclic rate of fire of about 750 to 775 rounds per minute; the weapon used a curved box magazine holding 30 rounds that could also be used on the M1. The **M3** was a special night-fighting version with a large infra-red night sight, but only about 2,100 of these were made. The M3 proved to be the one version of the Carbine M1 series that was not produced in quantity, for by the time the war ended the production total had reached 6,332,000 of all versions, making the weapon the most prolific personal weapon of World War II.

For all its handiness, the Carbine M1 series had one major drawback, and that was the cartridge used. Being an intermediate-power cartridge it generally lacked power, even at close ranges. Being a carbine the M1 also lacked range, and was effective only to 100 m (110 yards) or so. But these drawbacks were more than countered by the overall handiness of the weapon. It was easy to stow in vehicles or aircraft, and the M1A1 with its folding butt was even smaller. It handled well in action and was deemed good enough for German Army use as the **Selbstladekarabiner 455a** after enough had been captured during the latter stages of the war in Europe.

But for all its mass production and war-time success, the M1 is now little used by armed forces anywhere. Many police forces retain the type, mainly because of the low-power cartridge fired which is safer in police situations than more powerful rounds. Typical of these is the Royal Ulster Constabulary, which uses the Carbine M1 as a counter to the far more powerful Armalites of the IRA. Another part of the M1 story is the current lack of adoption of the M1's intermediate-power cartridge. During the war years these cartridges were churned out in millions but now the cartridge is little used and has not been adopted for any other major weapon system.



Originally produced by Winchester, the lightweight M1 carbine was eventually manufactured by more than 10 companies in numbers exceeding six million.

Specification
Carbine M1
Calibre: 7.62 mm (0.3 in)
Length: 904 mm (35.6 in)
Length of barrel: 457 mm (18 in)
Weight: 2.36 kg (5.2 lb)
Muzzle velocity: 600 m (1,970 ft) per second
Magazine: 15- or 30-round box

Left: Front-line troops soon found that the easy handling M1 carbine was much less of a burden than a rifle when slogging through the surf or the jungle, and it began appearing with front-line Marine Corps units.

A Marine, member of a machine-gun crew, clutches his M1 carbine and the ammo for a Browning machine-gun while waiting for his partner to hurl a grenade.

US Army Part 4

Armour

Once controversial, still costly, but a source of immense pride, the US Army's latest and most advanced main battle tank is the celebrated M1 Abrams. The M1 is an entirely new design owing nothing to earlier tanks like the M60 series, which can trace its ancestry back to the M26 of World War II. With the M1, the US Army has made a quantum jump in tank design with new and novel features like a gas turbine engine in place of the customary diesel powerpack. The gas turbine is more compact for a given power output and provides more rapid power responses, but it also has higher fuel consumption. Thus volume saved in the engine is sacrificed to greater fuel capacity. Also, the gas turbine's reliability is suspect in the long term. Apart from its powerpack, the M1 has a very resilient suspension and combined with its high power-to-weight ratio this produces sprightly performance that is limited not by the capabilities of the suspension but by whatever buffeting the four-man crew can tolerate. In many ways, the M1 Abrams can be said to be a 'sports car'. Initial batches will be fitted with the 105-mm (4.13-in) M68 gun, the American version of the succesful British L7A1, but it is planned to fit later batches with a more powerful 120-mm (4.72-in) smooth-bore gun produced in the United States under licence from Rheinmetall of West Germany. Allied with these guns is a very advanced computer-based fire-control system that uses information from an array of sensors to ensure the all-important first-round hit. Communications and other subsystems within the M1 are no less advanced.

Current plans are for thousands of M1 Abrams tanks to roll off production lines at the Lima, Ohio Army Tank Plant, and other sources are being investigated. At first regarded as almost scandalous in its cost and complexity, the M1 now enjoys a generally good reputation, but cost remains a significant factor. In recent years, the price of the machine has been under scrutiny and criticism, but the vehicle gets no cheaper. Reliability and cost-effectiveness have improved, but it appears unlikely that the army will be able to afford as many M1s as it wants. For all that, the M1 is now in service in Germany and more are arriving every month.

The General Dynamics Land Systems M1 Abrams MBT (left) and FMC M2 Bradley infantry fighting vehicle (right) are two of the key elements in the all-arms team that also includes the artillery, engineers and army aviation (comprising both transport and attack helicopters).

With the M1 Abrams, as with many systems intended for a nuclear war that has not happened, the truth is that nobody knows quite what the thing will do. 'We can't use it under actual conditions,' complains Captain Michael P. Curphey in Wiesbaden. No American soldier since 1950 has seen a real enemy tank coming at him. Ordnance is so costly that many crews have never fired a live round. The M1 Abrams is designed for rough countryside but in densely-populated Germany and Korea, farmers are less than enthusiastic about seeing their crops trampled. In actual combat, a tank would lie in wait for the enemy by driving into a house and hiding beneath its wreckage, a tactic that cannot be rehearsed. Says Curphey, 'most of what we know is hypothetical . . .'

The backbone of American armour forces remains the M60 series, serving as a main battle tank in its M60A1 and M60A3 versions. Both have diesel engines and are armed with the 105-mm (4.13-in) M68 gun, but the M60A3 also has an improved fire-control system. Compared with its Soviet counterpart, the M60 is high, heavy, and inclined to be cumbersome in performance, but improvements and modifications ensure that the M60 will keep its place among more important tank types. The US Army has 9,000 M60s (its total tank strength being 12,130 of all types). To back up this machine, 2,000 M48 tanks remain in service, some with the National Guard. Some of these are armed with a 90-mm (3.54-in) gun, but the M48A5 has the 105-mm (4.13-in) gun and can be said to be almost up to M60 standard. No M48s remain in Europe, their main locations being the Far East and reserve/storage.

The M1 Abrams MBT is now entering service in increasing numbers. It has the same 105-mm M68 tank gun as the M60 which came into service 25 years ago. The M1A1 with a 120-mm smooth-bore gun, as fitted to the West German Leopard 2 MBT, is expected to enter service in 1985-6.

The US Army currently has no light tank force, a serious flaw when rapid deployment by air is contemplated, but some M551 Sheridans remain in inventory. The M551 was one of the American defence industry's more spectacular failures, intended to be armed with a 155-mm (6.1-in) combined missile-launcher/gun which was never perfected. Some have been stored or converted to resemble Soviet vehicles for exercise purposes, and numbers have been sold abroad. Able to deploy large numbers of main battle tanks today only by sea, the US Army retains its faith in the light tank concept and is seeking machines armed with a 75-mm (2.95-in) gun suitable for the RDJTF, while the US Air Force continues to want the McDonnell Douglas C-17 transport to carry them.

The M48 and M60 chassis are the foundation for a variety of vehicles used to support armoured forces. The M60 provides the basis for the M728 Combat Engineer Vehicle, armed with a 165-mm (6.5-in) demolition gun and equipped with such items as a front-mounted dozer blade and an A-frame jib. The M48 and M60 are used to carry varying sizes of combat bridges. For front-line repair of tank battalion vehicles, large numbers of M88A1 armoured repair vehicles (ARVs) are still being produced. This highly specialized vehicle is equipped with a large A-frame and all manner of special tooling for keeping tanks running. The M88A1 can carry spare powerpacks, wheels and tracks.

Armoured strength is not measured in tanks alone, for the US Army has invested heavily in armoured personnel carriers (APCs) mainly for its mechanized infantry. The principal type is the M113, which has armoured protection for its crew of two and 11 fully-armed soldiers. A simple vehicle, the M113 can be configured for a number of special purposes, some of which have their own designations. One of the most important is the M577 mobile command post. Others are the M106 (107-mm) and the M125A1 (81-mm) mortar-carriers and the M163 armed with a 20-mm Gatling cannon for anti-aircraft use. The most specialized of all M113s is the M901 which has an armoured TOW launcher at the end of elevating arms to enable the missiles to be fired while the vehicle remains behind cover. Numbers of M901s are being issued to units in Germany, and a move is afoot to replace the existing missile with the I-TOW.

While the M113 is a successful APC with Vietnam battle scars, it lacks provision for embarked soldiers to fight from the vehicle except with machine-guns fired from roof hatches. Modern combat demands that crews fire and fight while on the move. This concept has led to the mechanized infantry fighting vehicle (MICV). After a prolonged period of vehicle development, the US Army has now been issued with this new type in the forms of the M2 Bradley Infantry Fighting Vehicle (IFV) and the almost identical M3 Cavalry Fighting Vehicle. Both are complex APCs able to fight on the move. The M2 IFV has a crew of three and carries six men. Its armament, in a roof turret, is a 25-mm M242 Chain Gun capable of firing a variety of ammunition types at a rate of up to 200 rounds per minute. The M242 is backed up by a co-axial 12.7-mm (0.5) machine-gun, and there is provision on the turret to mount two TOW rounds. The embarked infantry are provided with six special 5.56-mm (0.223-in) automatic rifles fixed to and firing from firing ports in the sides and rear of the hull, and the infantrymen can leave the vehicle through a hatch at the rear; the M3 lacks this capacity.

An M48A5 MBT of the US Army moves forward during Exercise 'Team Spirit' held in South Korea in 1984. The American tank battalions in South Korea are equipped with the older M48A5s, to ensure commonality with South Korean tanks.

Without question, the M2 Bradley IFV is a powerful battlefield asset but it is seen, too, as another example of the 'gold-plated' approach, for each M2 costs well over $500,000 in its most basic form, or almost as much as the needed light tank. Thus, the M2 will not replace the M113 but will supplement it in mechanized infantry battalions and cavalry squadrons. The chassis of the basic M2 is to be used for the MLRS artillery rocket system and is already being adapted for other roles.

A well-camouflaged M113 Armoured Personnel Carrier of the US Army takes part in Exercise 'Team Spirit'. The M113 is the most widespread APC in the world, with over 70,000 having been built.

13 PASS